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Field Demonstration of General Motors Environmental Improvement Proposal (EIP) A Retrofit Kit for GMC City Buses

Southwest Research Inst, San Antonio, Tex

Prepared for

Environmental Protection Agency, Ann Arbor, Mich Mobile Source Pollution Control Program

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FIELD DEMONSTRATION OF GENERAL MOTORS ENVIRONMENTAL IMPROVEMENT PROPOSAL (EIP) - A RETROFIT KIT FOR GMC CITY BUSES

by
Karl J. Springer

FINAL REPORT
Contract PH 22-68-23

Prepared for
Environmental Protection Agency
Office of Air Programs
Mobile Source Pollution Control Program

December 1972

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This report describes the results of a two year test of 3 GM city buses installed with the Environmental Improvement Program kit. Inspections were made at the beginning, after 5,10, 16 and 24 months of routine city bus operation by the San Antonio Transit System. In most instances, the claims made by the manufacturer for the retrofit kit, applicable to about 25,000 in-service buses, were verified. All but NOx pollutants were significantly reduced. Of the 3 principal items that affect exhaust emissions, the oxidation catalyst was found to be ineffective and dropped from the test after one year of operation. The component effective in reducing emissions was the Low Sac Needle injector. The vertically-directed exhaust improves the dilution of the exhaust, thereby reducing the observed odor at street level while tending to make any smoke discharge more visible.

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Approved by:
John M. Clark, Jr.
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Technical Vice President
Department of Automotive Research

FOREWORD

This project was an outgrowth of Southwest Research Institute Proposal 11-7289, dated May 4, 1970, provided at the request of the Environmental Protection Agency (EPA). A joint meeting with officials from the Department of Transportation (DOT), Urban Mass Transportations Administration (UMTA), EPA, and representatives of San Antonio Transit System, General Motors Truck and Coach Division, and Southwest Research Institute was held at SwRI on April 29, 1970. The purpose of the meeting was to discuss the Environmental Improvement Proposal (EIP) made by GM Truck and Coach Division in December 1969 to DOT's UMTA. As a result of this meeting, a proposal for field demonstration and testing was prepared and subsequently accepted. Modification 9 was issued to the basic contract for the Long-Range Investigation of Diesel Exhaust Emissions on July 1, 1970 authorizing the start of the extended fleet test. Modification 11 was received on April 16, 1971, authorizing continuation of the test to the originally planned two-year test duration. Work began in July 1970 and was completed in November 1972. The EPA Project Officer in charge of this demonstration was Mr. Ralph Stahman, Test and Evaluation Branch, Division of Emissions Control Technology, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105; and the SwRI Project Director was Mr. Karl J. Springer. The project was identified by SwRI as 11-2340-04.

ABSTRACT

The Environmental Protection Agency, in support of the Department of Transportation's Urban Mass Transit Administration, sponsored a two-year demonstration of an Environmental Improvement Program (EIP) proposed by General Motors Corporation. This report describes the results of a two-year test of three GM city buses on which the parts which comprise the EIP kit had been installed. Inspections were made at the beginning, after 5, 10, 16, and 24 months (115,000 miles) of routine city bus operation by the San Antonio Transit System. Of importance was the nuisance odor, smoke and noise emissions and unburned hydrocarbons, carbon monoxide, and oxides of nitrogen pollutants. Also investigated was the effect of fuel. In most instances, the claims made by the manufacturer for the retrofit kit, applicable to about 25,000 in-service buses, were verified. Significantly less odor, smoke, unburned hydrocarbons, partially oxygenated compounds, and carbon monoxide were produced while a slight increase in oxides of nitrogen was found. The slight decrease in interior noise, claimed by the manufacturer, seemed to be offset by a slight increase in exterior noise. Of the three principal items that affect exhaust emissions, the oxidation catalyst was found to be ineffective and was dropped from the test after one year of operation. The vertically-directed exhaust improves the dilution of the exhaust, thereby reducing the observed odor at street level while tending to make any smoke discharge more visible. The component effective in reducing emissions was the Low Sac Needle (LSN) injector, which has been required standard equipment on all Detroit Diesel Engines in road use beginning in 1970. Immediate retrofit of older buses with LSN injectors has been recommended along with replacement of the injector rocker arm actuator which is subject to wear.

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I. INTRODUCTION

The emissions from diesel-powered vehicles, notably odor and smoke, have been the subject of industry and government research for a number of years. The municipal bus, widely used for urban mass transportation, has received the brunt of public objectionability mainly due to the visible and odorous exhaust gases emitted by certain vehicles under certain operating conditions. Diesel exhaust emissions comprise more than smoke and odor, though these are the most widely known pollutants from this class of engine. Hydrocarbons and carbon monoxide, chief pollutants from gasoline-fueled passenger car engines, are substantially less from the diesel engine; and only nitric oxide keeps the diesel from being considered a "clean" engine.(1)*

Although the odor itself has not been positively found a health hazard, it does, like smoke, qualify as a nuisance emission as it is an annoyance and thereby affects public welfare. A considerable amount of research has been reported on the emissions from diesel engines. A recent study of ways to reduce diesel odor and smoke(2) contained over 300 references, many of which were related to city bus emissions.

On the order of 90 percent of the city buses operated in the U.S. today were made by GM Truck and Coach Division and are powered by 6-cylinder (inline and Vee configuration) and 8-cylinder (Vee configuration), 2-stroke, 71 series (71 cubic inch displacement per cylinder) engines made by the Detroit Diesel Division of General Motors Corporation (GMC). For the past five years, the majority of the work on odor for EPA, formerly the National Air Pollution Control Administration of the Department of Health, Education, and Welfare, has been devoted to the city bus odor problem.

Parts I, II, III, and IV(3-6) of the Long-Range Investigation of Diesel-Powered Vehicle Exhaust Emissions, of which this field demonstration is a part (see Foreword), and studies of public objectionability of Diesel Odor(12,13) describe some of the activities by SwRI's Emissions Research Laboratory on behalf of EPA. Several technical papers(7-11) have been published summarising the highlights of the long-range program and are recommended background material. These studies covered the three important aspects of diesel odor, namely (1) a method of measurement and expression, (2) evaluation of control technology, and (3) an assessment of public reaction to diesel odor.

As mentioned in the Foreword, a 2-year, 3-bus field demonstration of the General Motors Truck and Coach Division's Environmental Improvement Proposal (EIP kit) was authorized by EPA in July 1970. The kit was claimed by GMC to reduce emissions, noise, and vibration. The cost as of December 22, 1969 for the entire EIP kit was reported as $1100 for 6V-71 size and $1290 for 8V-71 size engine-powered GM coaches.

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* Superscript numbers in parenthesis refer to List of References at the end of this report.

The three items featured as reducing emissions were a vertical stack, a catalytic muffler, and improved needle valve unit injectors known as Low Sac Needle or LSN injectors. The kit is composed of items, most of which were tested during Parts I, II, III, and IV of this long-range investigation, for which the relative merits and effectiveness of each major feature had already been reported. This included studies of exhaust dilution due to stack placement, effect of catalytic mufflers, improved injectors, fuel type, etc.

During the April 1970 meeting at SwRI (referenced in the Foreword), the merits of each major item were discussed and the component test results cited. It was pointed out that, although not reducing the amount of odor discharged, the vertical stack may be a useful method to disperse the exhaust and thereby render the odor less noticeable to the general public. Although Part I data indicated a sevenfold increase in reasonable minimum atmospheric dilution (from 100:1 to 700:1) for the use of a tall vertical stack relative to a low-to-the-ground horizontal discharge, little was known about the atmospheric dilution of the exhaust from a stack located behind a bus. The previous trace-gas studies employed a tractor-box type trailer rig in which the stack was in front of the 40-foot-long van trailer.

A paper presented by GM Research at the January 1971 meeting of the SAE(14) described the results of dilution experiments made with a vertical stack-equipped city bus. It is unfortunate that only the engine-idle, static-vehicle condition was studied and that the vertical stack was not identical to that fabricated as part of the EIP kit. For the one condition studied, GMR found essentially an eightfold increase in dilution by directing the exhaust vertically instead of horizontally. Modification 9 to contract PH 22-68-23 calls for a careful definition of the effect of vertically-directed bus exhaust on perceived odor. These field and laboratory studies are currently in progress and will be covered in the Part V Final Report to be published in 1973.

It was pointed out at the April 1970 meeting that, during Part II, GM Truck and Coach furnished several "cornpopper"-type catalytic mufflers for test and evaluation. Repeated screening tests, made after limited (one month) street operation, indicated little positive reduction on odor or other emissions. This same muffler was used in the EIP project. It is a Davidson Chemical Catalyst Zone 61 copper oxide material deposited on the surface of nominal 1/4-inch diameter alumina balls.

Screening tests (Part II) and a six-month fleet test of three city buses consistently showed significant reductions in odor, smoke, and other emissions from the use of correctly-adjusted needle (LSN) injectors. Although there seems to be a difference of opinion concerning the effect of the injectors on NO production, the known advantages and disadvantages of each component were fully reported and discussed. At the urging of UMTA, however, it was agreed to perform an extended, two-year fleet test of the comprehensive retrofit kit in three buses. These tests were requested to verify the claims by the kit manufacturer as to improvements in noise, odor, smoke, and other gaseous-type emissions. The tests were designed to determine overall kit performance as well as relative improvement by the catalytic muffler.

Other demonstrations of the EIP kit were conducted under UMTA sponsorship by the Public Utilities Commission, San Francisco, California and the Washington Metropolitan area Transit Commission, Washington, D.C. The results of these projects were reported in References 15 and 16. The Mitre Corporation, also under contract to UMTA, conducted data analysis and cost studies for the EIP kit and published their findings in Reference 17. All three references are recommended reading on the subject of the EIP kit.

II. TEST PREPARATIONS

This section includes the test objective, description of the vehicles and EIP kit, installation and adjustments, and the test plan-procedures employed.

A. Objective

The object of this test was to determine potentialities of the GM EIP retrofit kit for reduction of noise, odor, smoke, and tailpipe emissions from three GM city busses powered by Detroit Diesel 6V-71E busses.

B. Approach

To ascertain performance improvements and reduction of emissions, liberal use of back-to-back type tests were employed to permit direct comparison of the EIP-equipped bus versus the stock-equipped vehicle with an additional series of tests of the EIP kit less the catalytic muffler. Noise tests were made in the normal configuration before installation of the kits and immediately after kit installation. The initial emission measurements were made after about 1000 miles of operation by substituting for the EIP catalytic muffler a stock unit and for the LSN injectors the S, or crown valve-type, stock injectors. Emission inspections were then made at four points during the test. Specifically excluded was the effect of the vertical stack on dilution and vibration-ride measurements. The effect of fuel (i.e., DF-1 or DF-2), on exhaust emissions was studied during one inspection while the effect of timing was studied as a part of the basic contract.

C. Vehicle and EIP Kit Description

The three vehicles selected were from the San Antonio Transit System fleet of GM Truck and Coach Division 45-passenger coaches. The specific vehicles were all TDH-4519 models powered by similar Detroit Diesel 6V-71E 4-valve engines equipped with size 60-type S injectors. The three buses, described in more detail in Appendix A, had received engine overhauls sometime prior to but not as a requirement for the EIP kit. It was desired, for purposes of the test, to have three vehicles and engines that could reasonably be expected to run for two years at a high rate of mileage accumulation without engine failure.

The EIP kit has been adequately described in Reference 18 and a revised proposal published in April 1970.(19) In addition to a different set of injectors, muffler, and a vertical exhaust stack, a vertical air inlet, enlarged air cleaner, engine mounts, sheet metal fairings, housings, etc., were included. For a complete description of the kit, please refer to Reference 18 or 19. Some key items of the EIP kit deserve special mention.

The catalytic muffler, described by a GM Coach Service bulletin, is shown in Figure 1 with inspection fill plug removed. The unit is in a horizontal position when installed under the coach. Figure 2 is a cutaway of the muffler and shows the perforated metal screen on which the 40-lb charge of catalyst-coated alumina balls is carried.

Figure 3 is a view of an LSN injector after a short period of operation. Externally, it appears basically the same as the crown valve unit; but, internally, it is different. Figure 4 is a cutaway showing the plunger and barrel and the injector tip. It is the injector tip assembly which incorporates an improved needle-type valve that reduces the residual fuel in the injector tip as shown schematically in Figure 5. It is this residual fuel leaking into the combustion chamber at odd moments during the cycle that has been found responsible for some of the odor, smoke, and other exhaust emissions.

D. Test Fuel

A commercial DF-1 (No. 1) kerosene-type diesel fuel was utilized in all scheduled inspections during the two-year demonstration. This fuel is described by the inspection report on Table 1. Also listed on Table 1 are fuel inspection data for two DF-2 (No. 2) diesel fuels used at one point in the test to investigate the effect of fuel type on emissions.

E. Installation

Three complete EIP kits were furnished to San Antonio Transit System at no charge by the manufacturer, the Truck and Coach Division of General Motors Corporation. In addition, expert guidance in the installation of the kits was provided by the manufacturer during the actual installation and retrofit phase. An engineer and two experienced technicians did an excellent job of not only supervising and installing the kits on the first two buses, but also training the San Antonio Transit staff so that they could efficiently and correctly apply the retrofit items to the last bus modified.

It was found that, for a well-trained crew using up-to-date and first-rate facilities and equipment, a normal installation will take slightly less than the 160 hour originally estimated by GM. We found that on Bus 702, the last bus converted, the direct mechanic time was more like 150 hour, exclusive of any engineering supervision, i.e., no problems encountered. This level of effort was discussed with the manufacturer's representative, and it was agreed that 150 hour was a reasonable figure.

One area of importance during the installation phase was that of engine and transmission adjustment. The 1970 engine certification for smoke is specified at 1.460 injector setting by Detroit Diesel Division. However, the coach manufacturer indicates 1.470 to be the optimum for lowest overall

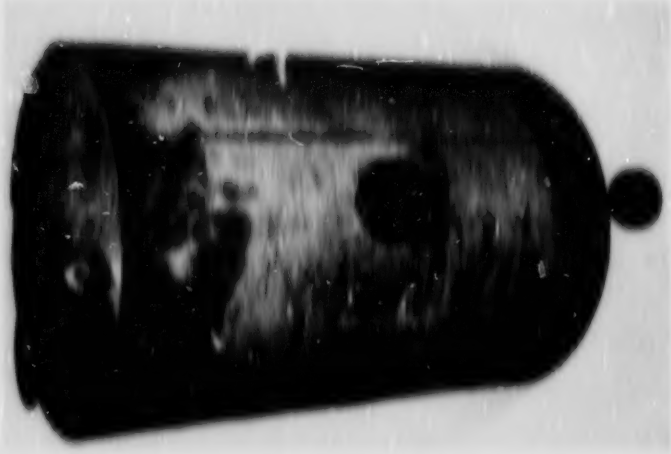


FIGURE 1. CATALYTIC MUFFLER
(Horizontal Position)

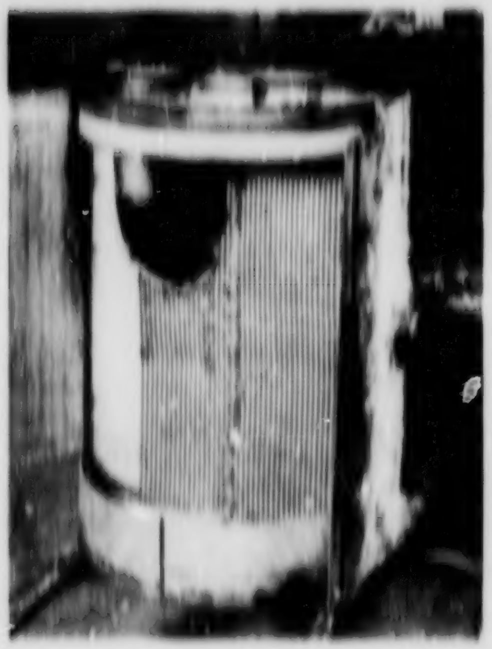


FIGURE 2. CUTAWAY OF CATALYTIC MUFFLER
(Photo Furnished by GMC)

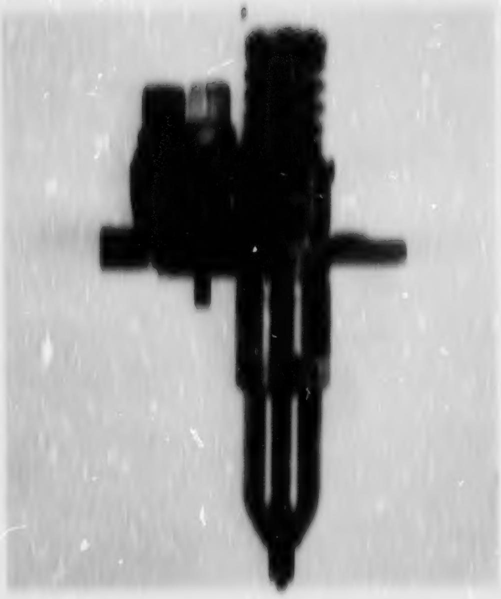


FIGURE 3. L8N UNIT INJECTOR--

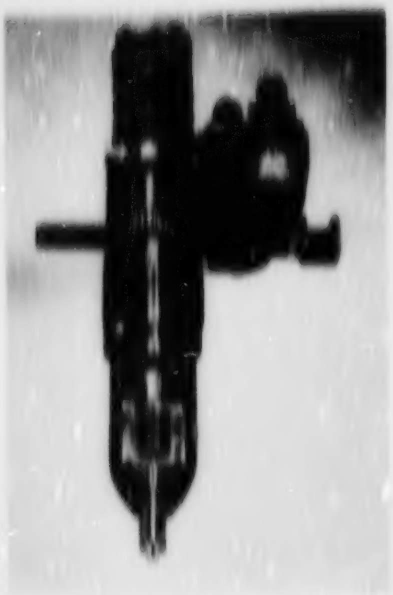


FIGURE 4. CUTAWAY OF
L8N UNIT INJECTOR
(Photo Furnished by GMC)

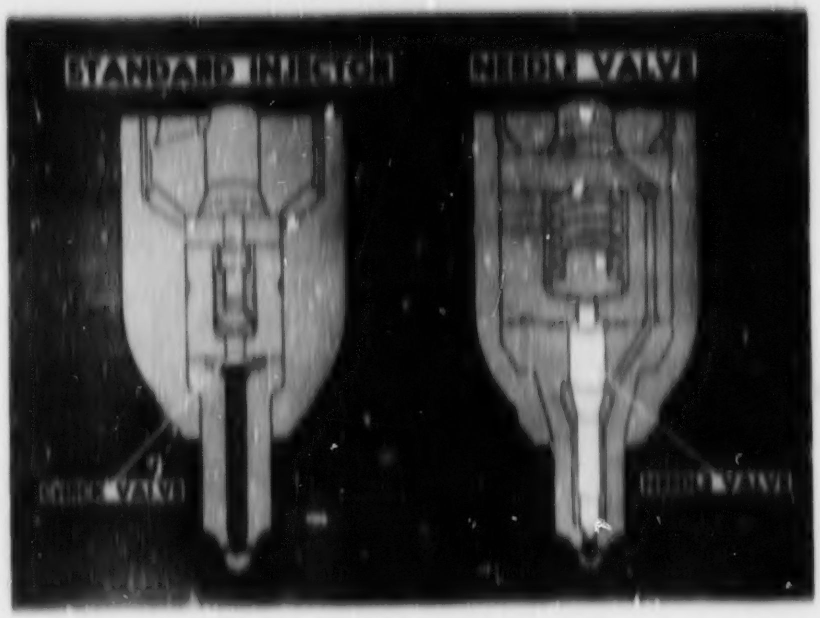

STANDARD INJECTOR
NEEDLE VALVE
CHECK VALVE
NEEDLE VALVE

FIGURE 5. SCHEMATIC OF CROWN (STANDARD)
AND NEEDLE VALVE INJECTOR TIPS
(Photo Furnished by GMC)

TABLE 1. FUEL INSPECTION DATA FOR LOCAL AND CHICAGO AREA DIESEL FUELS

Fuel Code	EM-165-F	EM-166-F	EM-139-F
ASTM Designation	(DF-1)	(DF-2)	(DF-2)
Source of Fuel	Local	Local	Chicago
Distillation:			
IBP°F	330.0	396.0	360.0
10%	360.0	428.0	398.0
20%	370.0	438.0	416.0
30%	380.0	450.0	436.0
40%	390.0	470.0	460.0
50%	416.0	488.0	480.0
60%	426.0	502.0	498.0
70%	438.0	520.0	520.0
80%	448.0	542.0	550.0
90%	460.0	570.0	584.0
EP	508.0	624.0	632.0
% Recovered	99.5	99.5	99.5
% Residue	0.5	0.5	0.5
% Dist. Loss	0.0	0.0	0.0
FIA Analysis:			
Aromatics, %	15.6	26.6	34.3
Olefins, %	1.4	nil	0.6
Saturates, %	83.0	73.4	65.1
Gravity, API at 60°F	44.5	36.2	35.0
Total Sulfur, %	0.00	0.07	0.48

emissions. Since this is an experiment with used buses, the EIP recommendation of 1.470 was used to adjust the injectors on these pre-1970 engines.

The other adjustment, critical to the EIP kit, is raising the engine upshift and downshift speeds. As these shift points dictate the way a bus operates and, to some extent, the route speed and passenger comfort, adjustments which materially alter those settings arrived at by years of trial-and-error experience by bus operators must be carefully considered. In essence, the original recommendations in the EIP brochure(18) were incomplete and vague. Instructions from the manufacturer were obtained specifying the desired upshift and downshift engine speeds. The upshift engine speed, the speed of the engine immediately after shift from torque converter to direct drive, was specified at 1100 rpm minimum. The downshift speed, the most critical for the standpoint of exhaust emissions per previous SwRI data, was specified at 300 rpm below the upshift speed.

Considerable difficulty was encountered in setting these speeds by the San Antonio Transit System. The GM maintenance manual was found to be inadequate to set the upshift point, although downshift could be fairly reliably set by the recommended bench technique. The electromechanical transmission governors used on the older buses are unreliable and difficult to set accurately. SwRI finally had to set the shift points on all buses using a chassis dynamometer and a level road course. Final adjusted shift points were 1125 rpm up (25 to 26 mph) and 825 rpm (18 to 19 mph) down, for the 4-5/7 rear-axle ratio San Antonio Transit buses. This upshift speed is about 1 to 2 mph higher than before adjustment and represents an increase in engine speed of about 100 rpm after upshift. The maximum rpm the engine operated in torque converter, low range, before upshift was increased as much as 200 rpm so that the engine now reaches 1800 to 1900 rpm before the upshift occurs. This is where high exterior and interior sound levels have been noticed. The downshift speed is also higher than before, about 150 rpm (3 to 4 mph).

Although the transmission shift points were finally set and verified in the field, this is one area that could bear additional attention should widespread retrofit be justified. An improved transmission governor that can be easily and reliably bench adjusted using a simple calibration procedure and equipment seems mandatory to realize the benefits of this proposal. A revised chart indicating governor rpm for desired engine rpm for the various rear-axle ratios and tire sizes will also be necessary. It is always good practice to field test one unit of many, but every bus should not have to be field adjusted, as was our experience. Should 100 percent field adjustment become necessary, an additional 8 to 12 man hours per bus should be allocated for installation of the kit.

Figures 6 and 7 are various exterior views showing the location and extent of sheet metal cowlings housing the vertical air inlet (right rear) and the vertical exhaust stack (left rear) as originally installed. A simple flapper valve may be noticed on the tip of the exhaust stack in the Figure 7 photographs. Midway through the test, this item was replaced by an exhaust tip diffuser, shown in Figure 8, designed by GM to diffuse the exhaust for lower visibility as well as eliminate the hinged flapper which eventually would be a maintenance item.

As a result of decreased intake air filter life with the EIP kit, changes were made by GM to alter the air inlet. The photographs in Figure 9 show the fiberglass air inlet shroud and pre-filter furnished by GM. Apparently, the relocation of the air inlet point to the right rear corner of the bus caused abnormally high dust loadings to be drawn into the engine shortening filter life. Figures 10 and 11 are photographs of the engine compartment. The new exhaust piping for the vertical stack is evident in Figure 10, and the enlarged air cleaner-inlet air duct and blower inlet housing may be noticed in Figure 11.

F. Test Procedures

This subsection will describe the modifications made to procedures previously developed and described for odor, smoke, and gaseous emission measurements. The measurement procedures used for the noise tests will be covered in Section III dealing with noise test results. The PHS smokemeter, shown in Figure 12, and the PHS odor kit, shown in Figure 13, were the basis for expression of smoke and odor results.

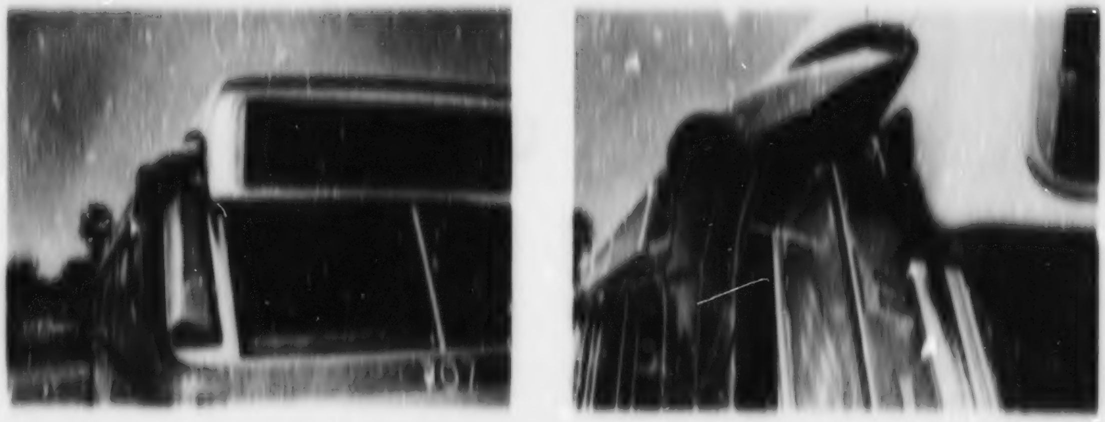
Odor was measured by the trained SwRI odor panel, shown in Figure 14, using the PHS kit of standards.(20) The panel rated the odor in terms of an overall intensity "D" in steps of 1 through 12, 12 being the strongest. Four subodors, or qualities, that compromise the "D" odor are "B" burnt smoky, "O" oily, "A" aromatic, and "P" pungent, in steps of 1 through 4. The odor measurement facilities, dynamometer, etc., have been adequately described in References 3 to 9. Any of these will suffice in illustrating the principle and approach used. The specific odor measurement and chassis dynamometer operating procedures are contained in Appendix A of Reference 6. All odor tests were made at a dilution level of 100:1.

Smoke was measured using a chassis dynamometer version of the Federal stationary engine procedure given in the June 4, 1968 Federal Register.(21) The bus was operated on a simulated Federal Smoke Test cycle including the two accelerations and the lugdown. For these tests, a single 16,000-lb equivalent inertia wheel, shown in Figure 15, was sufficient to give very close to the Federally-prescribed acceleration times for the stationary-operated engine. No difficulty was encountered in performing

Rear View

Air Intake

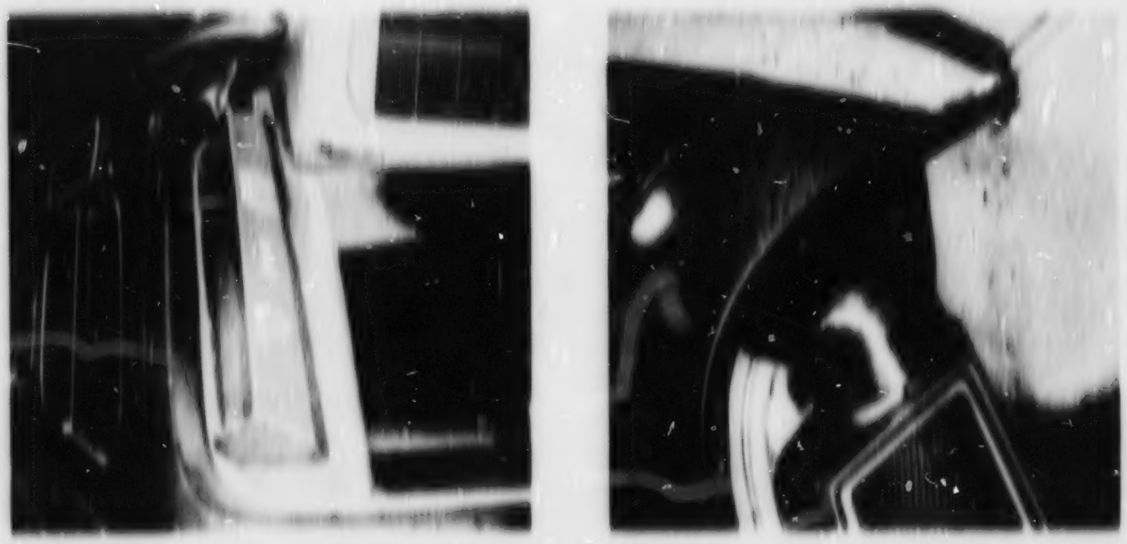
FIGURE 6. EIP EQUIPPED COACH AIR INTAKE AS ORIGINALLY INSTALLED



Exhaust

Exhaust Flapper

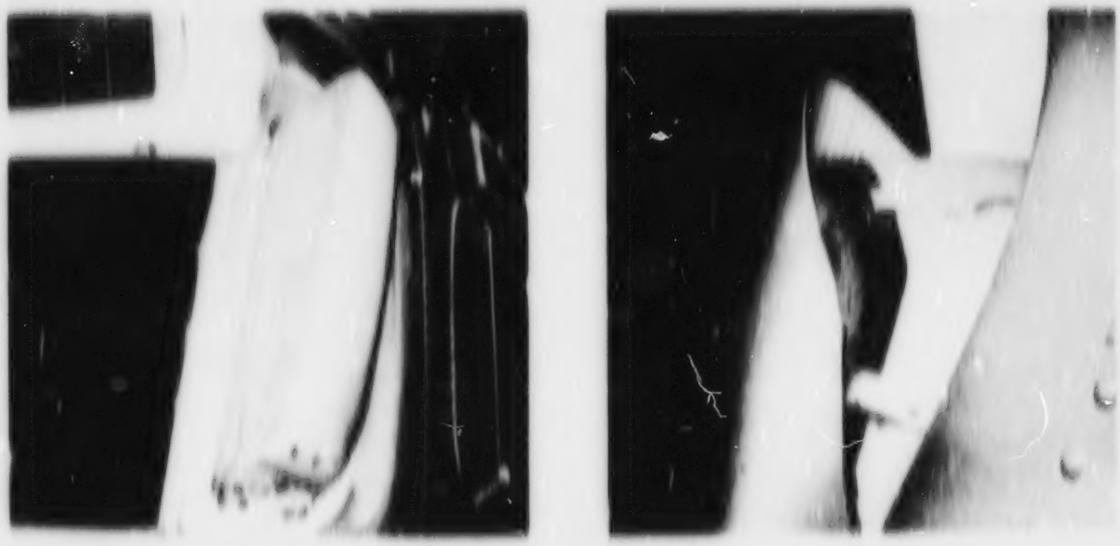
FIGURE 7. EIP EQUIPPED COACH EXHAUST OUTLET AS ORIGINALLY INSTALLED



Exhaust

Diffuser

FIGURE 8. EIP EQUIPPED COACH EXHAUST OUTLET
AFTER MODIFICATION



Air Intake

Shroud and Prefilter

FIGURE 9. EIP EQUIPPED COACH AIR INTAKE
AFTER MODIFICATION

FIGURE 10. EIP EQUIPPED COACH
EXHAUST EDUCTOR

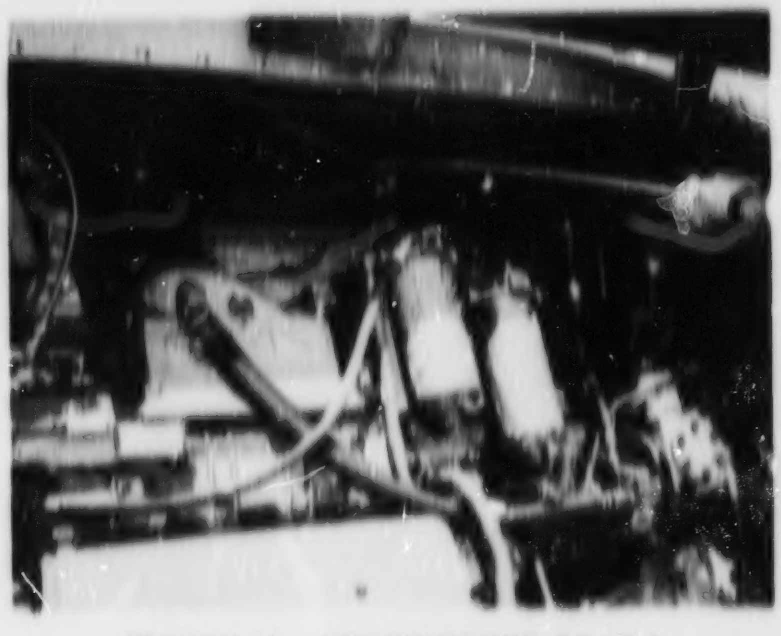


FIGURE 11. EIP EQUIPPED COACH
ENLARGED AIR CLEANER

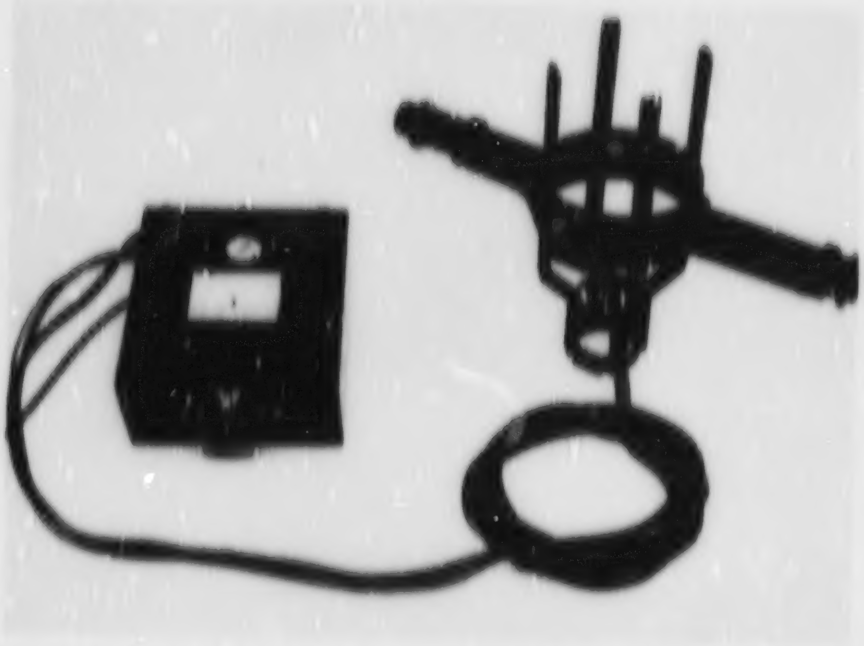


FIGURE 12. U.S. PHS DIESEL SMOKE OPACITY METER

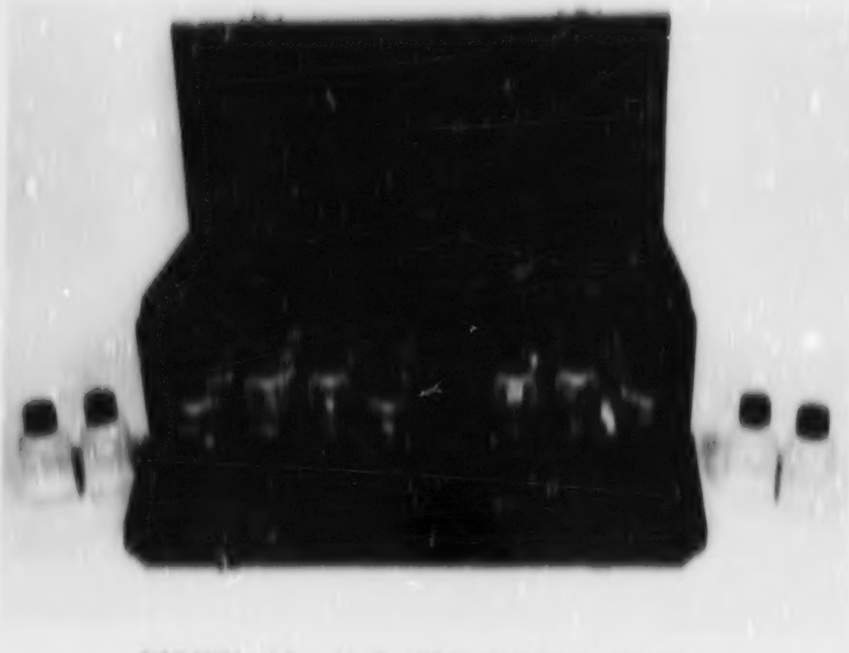


FIGURE 13. U.S. PHS DIESEL ODOR QUALITY-INTENSITY STANDARDS

FIGURE 14. SwRI TRAINED ODOR PANEL

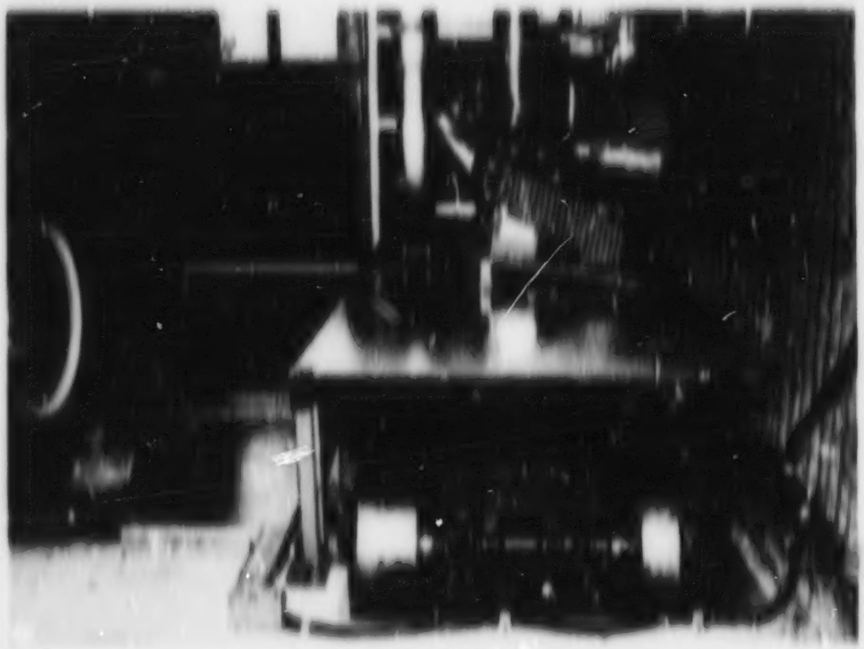


FIGURE 15. SwRI TRUCK-BUS CHASSIS DYNAMOMETER AND INERTIA SIMULATION FACILITY

the engine lugdown procedure in a linear-rpm manner. The first acceleration was from 750 to 1800 rpm in 8 seconds, the second from 1260 to 1900 rpm in 14 seconds, and the lugdown from 1900 to 1260 rpm in a nominal 35 seconds. The time would vary slightly from bus to bus, but repeatability of the smoke test for a given bus was found to be excellent.

A power curve from 2000 to 1000 rpm in 200 rpm increments was also made with smoke recorded simultaneously. As the engine speed decreased below 1200 rpm, the tendency of the engine to smoke increased greatly with two to three times the smoke at 1260 rpm and below being common. The Federal Smoke Test procedure is considered suitable for engines operating in GM city coaches with automatic transmissions. Gaseous emissions of HC, CO, NO, aldehydes, formaldehyde, and acrolein were obtained simultaneously during the steady state operating modes for odor measurement. Some of the equipment and instruments utilized are shown in Figures 16, 17, and 18.

Some refinement of the procedures was made to make the EIP evaluation as accurate as possible. For example, the cruise odor conditions of 20, 30, and 40 mph at 40 rear-wheel hp were changed to 900 rpm (24 mph), 1200 rpm (32 mph), and 1500 rpm (40 mph), all at a fuel rate midway between the measured full-load and no-load rate. This is known as "1/2 load" and seems to be a worthwhile improvement. It has decreased the potential variability due to transmission, rear axle, and tire power losses inherent in the old procedure.

Because of the extended operation involved for each bus, special steel-belted, single-ply tires were obtained and the bus jacked up to reduce the weight on the rear tires. This safety precaution allowed operation of a modified EMA, 13-mode cyclic test procedure. The chassis version of this procedure, described in detail in Appendix A of this report, calls for a 29-minute run at two engine speeds plus low idle. Since the 6V-71 engine in a two-speed automatic transmission GM bus operates over a wide speed range of 825 to about 1800 rpm, rated and intermediate (peak torque or 60 percent of rated speed, whichever is higher) did not apply. For the case of the 6V-71 in a bus, rated is 2000 rpm and intermediate is 1260 rpm.

In modifying the EMA procedure to be realistic with respect to municipal coach operation, an upper engine speed of 1600 rpm and a lower speed of 1000 rpm were selected. These modifications, especially the 1/2 load fuel rate, were more conducive to optimum catalyst operation in that the speeds were increased as well as the power level as evident by higher exhaust temperatures. The times in modes were reduced to 2 minutes, except modes 3, 7, 8, and 12, which remained 3 minutes. This resulted in a 30-minute cycle which could be safely and repeatedly conducted. Incidentally, studies had been previously made and were verified that essential emission stabilization was achieved during the 2-minute interval. Generally, the first

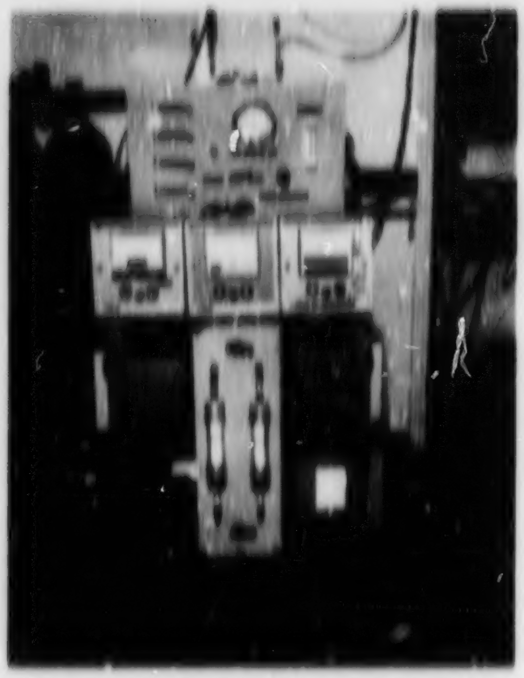


FIGURE 16. NONDISPERSIVE INFRARED ANALYSIS OF CO, NO, AND CO_2

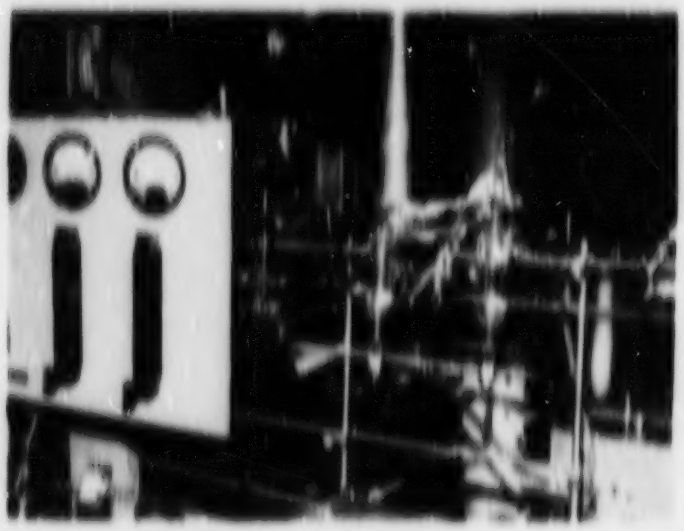


FIGURE 17. SAMPLING AND ANALYSIS APPARATUS

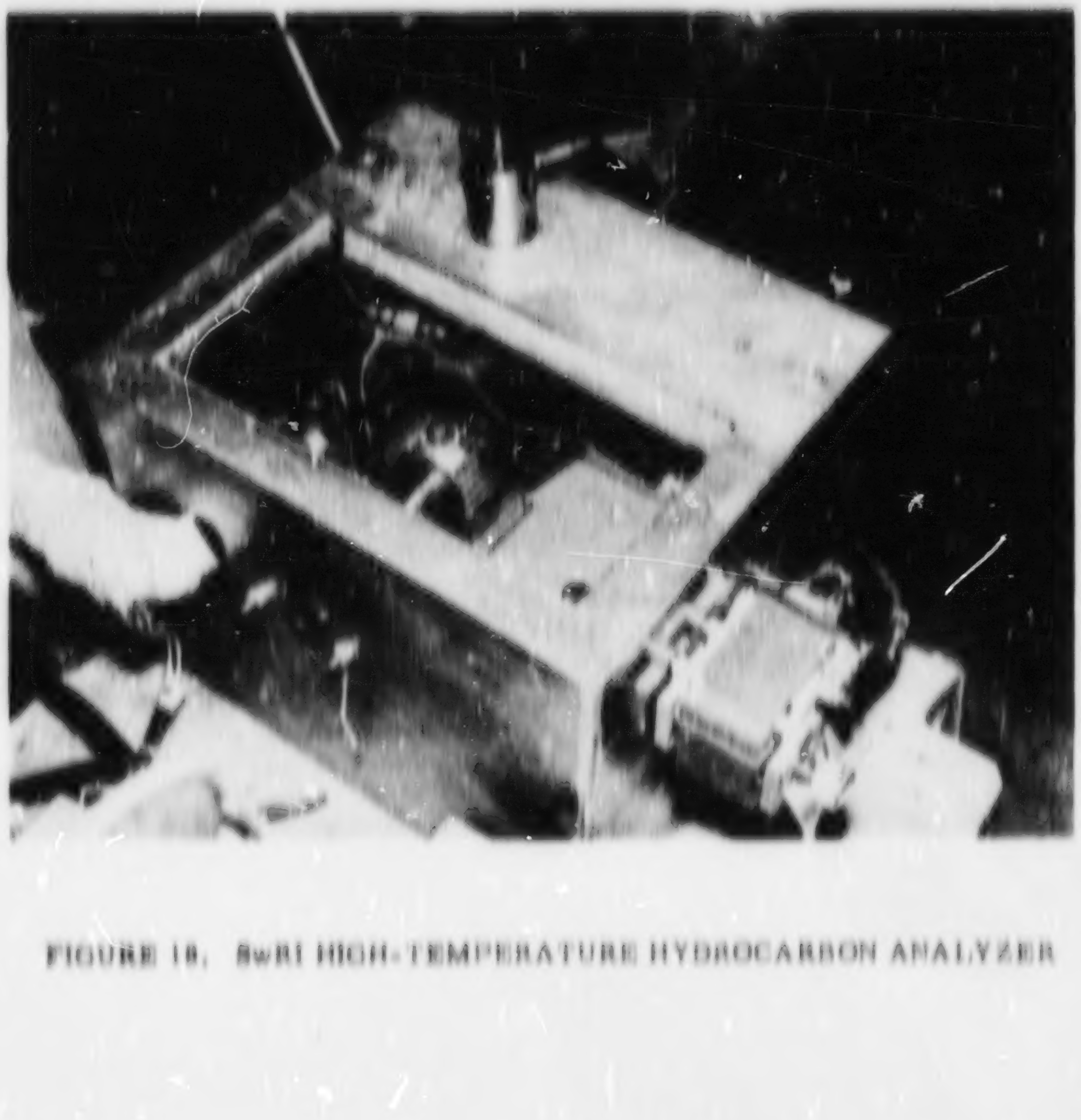


FIGURE 18. SwRI HIGH-TEMPERATURE HYDROCARBON ANALYZER

20 seconds were used to change load, with the last 60 seconds used to measure the emissions of CO, HC, and NO.

Appendix D of Reference 6 contains a copy of the California regulations-procedures for 1973 and 1975 diesel HC, CO, and NO. Reference 22 is an SAE paper describing the test procedure and its rationale for use with diesel powered vehicles. The EMA California ARB 13-mode gaseous test has since been adopted as a Federal regulation beginning with 1974 model year.(23) The procedure is essentially equivalent with the 1974 nationwide standards for HC + NO_2 and CO the same as 1973 California limits of 16 and 40 grams per bhp-hour respectively.

G. Test Plan

The test plan employed was as involved and complex as any yet devised for fleet test emissions evaluation. The initial series of tests, requiring over two weeks per bus after kit installation, was made as follows:

(1) Interior and Exterior Noise Tests

(2) Installation of Kit

(3) Operation of 1 to 2 Weeks--Approximately 1000 Miles

(4) Retest Interior and Exterior Noise

(5) Exhaust Emission Tests

(a) Odor, wet chemistry, gaseous emissions, and smoke with LSN injectors (1.470) and catalytic muffler.

(b) Gaseous emissions per modified EMA cycle with LSN injectors (1.470) and catalytic muffler.

(c) Odor, wet chemistry, gaseous emissions, and smoke with LSN injectors (1.470) and stock muffler.

(d) Gaseous emissions per modified EMA cycle with LSN injectors (1.470) and stock muffler.

(e) Odor, wet chemistry, gaseous emissions, and smoke with 60S injectors (1.470) and stock muffler.

(f) Gaseous emissions per modified EMA cycle with 60S injectors (1.470) and stock muffler.

III. NOISE TEST RESULTS

Noise was measured only before and after installation of the EIP kit. In order to properly quantify the noise reduction afforded by the EIP modification kit, three general types of tests were chosen: Exterior Drive-By, Interior Sound Level, and Interior Loudness. These tests are outlined in detail below.

A. Exterior Drive-By Test

This test was chosen to measure the reduction in loudness afforded by the installation of the EIP kit. For this test, the general procedure outlined in SAE No. J672 "Measurement of Truck and Bus Noise" was chosen, as it will parallel typical test runs on this type bus. A copy of this procedure is included in Appendix A of this report. The only modification made to the test procedures involved locating the microphone at 25 feet from the centerline of the bus path as shown in the Figure 19 test layout schematic.

If at some later date it becomes necessary to define the levels at 50 feet, the following equation may be used:

$$\text{SPL (in dB at 50 feet)} = \text{SPL (in dB at 25 feet)} - \text{K (dB)}$$

where

$$\text{K (dB)} = 20 \log\left(\frac{25}{50}\right) = 6.02 \text{ dB}$$

Accordingly, the sound-pressure level at 50 feet will equal the sound pressure level measured at 25 feet minus 6 dB. The octave band data taken in these tests were then converted to sones (units of loudness) by the method outlined in the test code.

In addition to the acceleration tests specified in the SAE test code, a similar number of tests were made with each bus traversing the test course at a constant 20-mph cruise with the transmission in low range. In summary, two passes were made for each of the eight test conditions on each bus before and after the installation of the EIP kit. For convenience, these test conditions are listed below:

Acceleration with upshift in the last 50 feet of the course:

(a) Curbside with air-conditioning system on.
(b) Curbside with air-conditioning system off.
(c) Streetside with air-conditioning system on.
(d) Streetside with air-conditioning system off.

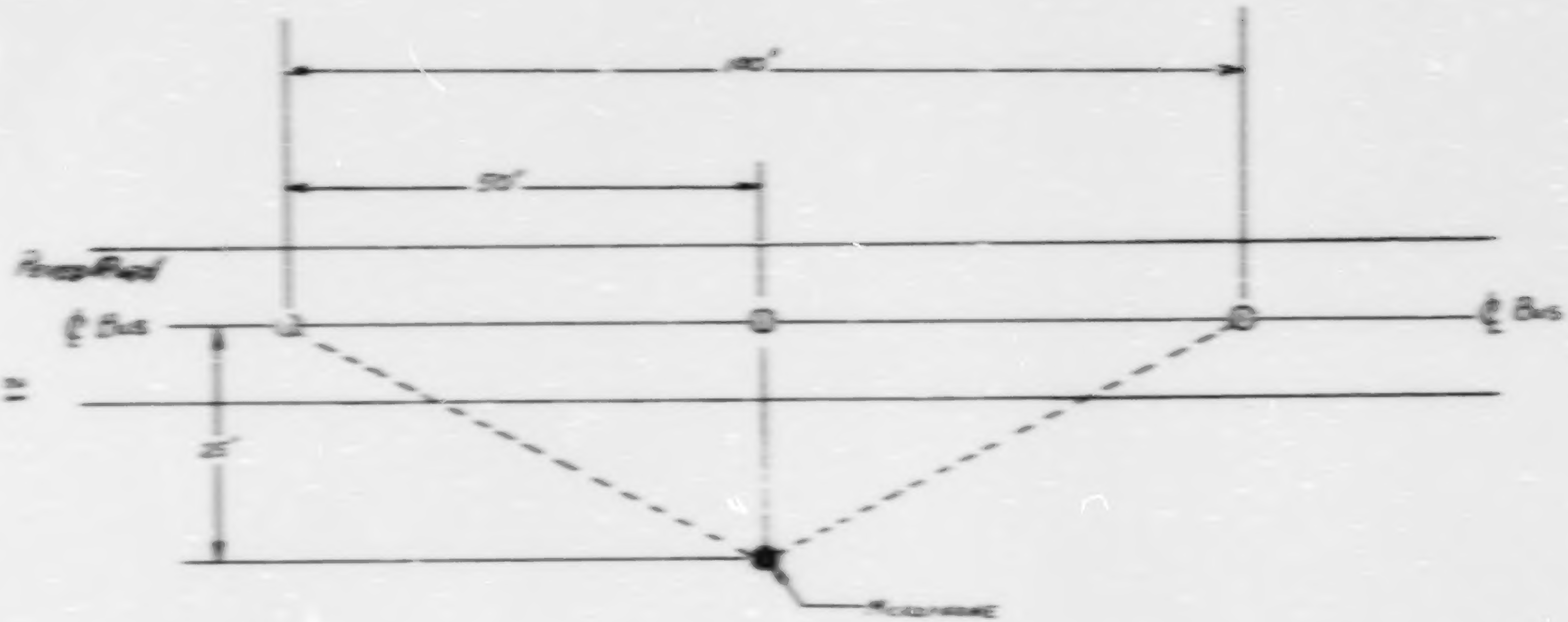

100'
50'
Paved Road
℄ Bus
℄ Bus
25'
Microphone

FIGURE 14. SCHEMATIC OF DRIVE-BY EXTERIOR NOISE TEST LAYOUT

Constant speed over the test course at 20 mph in low range:

(a) Curbside with air-conditioning system on.
(b) Curbside with air-conditioning system off.
(c) Streetside with air-conditioning system on.
(d) Streetside with air-conditioning system off.

Figure 20 shows some of the equipment which included a General Radio Type 1524-A data recorder, a General Radio Type 1560-P6 ceramic microphone with a General Radio Type 1562-A sound level calibrator, and a 1558-A octave band noise analyzer. Figures 21 through 23 are photographs of one of the buses undergoing exterior drive-by noise tests. Figure 21 shows the field test site while Figures 22 and 23 are curbside and streetside views of the bus relative to the sound measuring equipment.

The results of the eight drive-by tests, made before and after the EIP was installed, are presented in Table 2. The values of this table are in SAE sones. It will be noted that the average percent reduction for the acceleration tests is considerably lower than that for the constant speed test. Reductions of up to 30 percent in loudness level were found during the 20-mph low-range, constant-speed drive-bys. The reduction in the acceleration-upshift noise level, however, was found to be lower, especially on the curbside measurements where an increase in loudness level was measured. It is probable that the increase in engine-upshift speed offset the improvements expected with the modified bus for curbside tests.

The streetside acceleration measurements indicated slight reduction overall. This is probably due to the relocation of the exhaust pipe in a vertical direction instead of a horizontal direction toward the center of the street. The exhaust, as it issues from the horizontal 3-inch tailpipe, makes a noticeable sound; and, to the casual observer, this sound is no longer evident with the vertical stack. As apparently helpful as the vertical stack is in this regard, the increase in upshift speed seems to nullify most of the important gains in noise reduction demonstrated in the constant-speed runs. There is, of course, some inherent test variability and, consequently, some error involved in the acceleration-upshift noise tests. Buses do not always automatically upshift the same way at the same speed. If the bus is viewed as a narrow band responsive system being excited by a narrow band driving force, relatively minor fluctuations in rpm at the shift point can produce drastic differences in the radiated noise. It is this phenomenon that helps to explain part of the loudness data seen for Bus 702 in test Nos. 5 and 7 and for Bus 707 in test No. 7.

Each loudness level in the table represents the average of two trials in that configuration and, as such, substantiates the validity of each test value. The occurrence of such anomalies in the level of the radiated noise could produce situations where either higher or lower percent-reductions

FIGURE 20. SOUND LEVEL MEASURING EQUIPMENT

FIGURE 21. TEST SITE AND TRACK

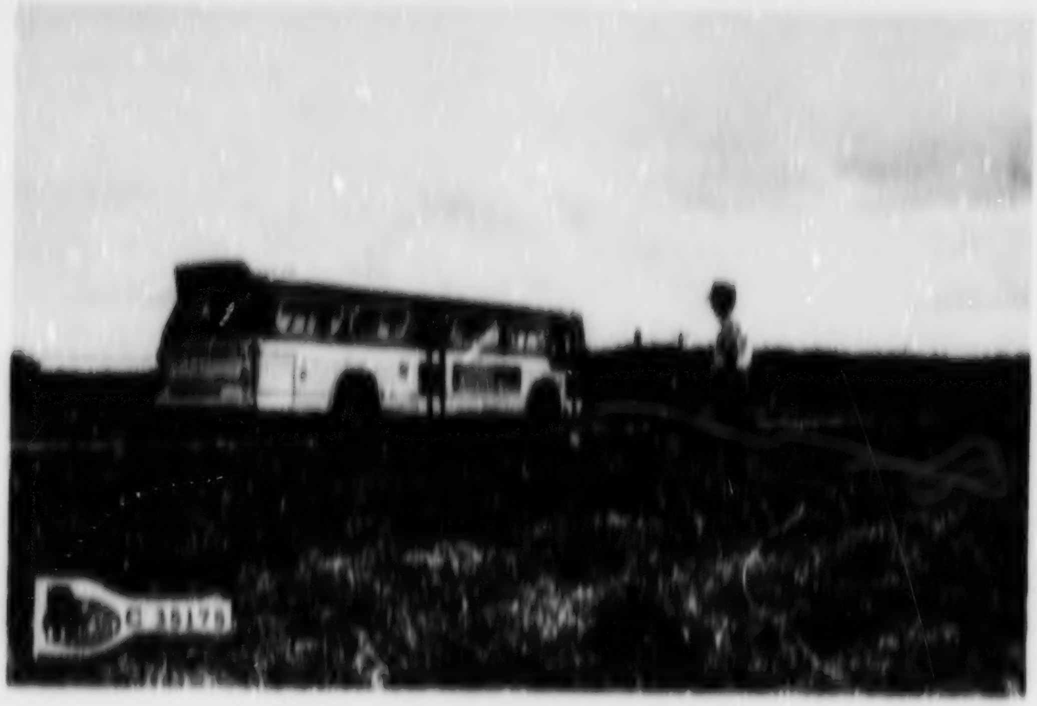


FIGURE 22. EXTERIOR NOISE TESTS--CURBSIDE

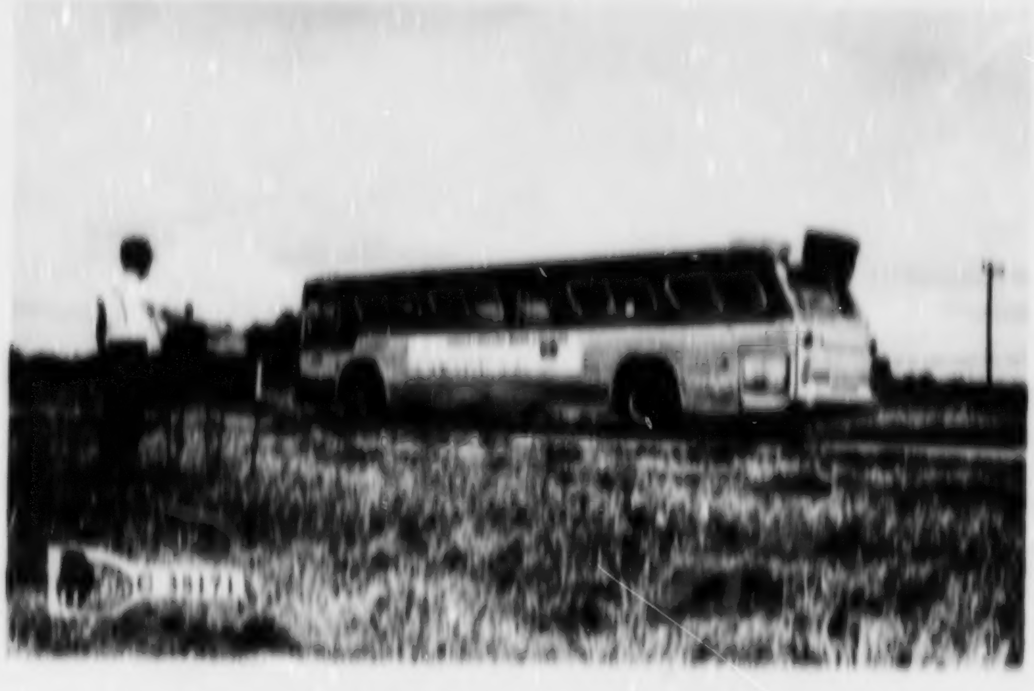


FIGURE 23. EXTERIOR NOISE TESTS--STREETSIDE

TABLE 2. LOUDNESS LEVEL OF MUNICIPAL BUSES ON DRIVE-BY TESTS IN S.A.E. SONES, GM-EIP FLEET TEST

Test No.	Test Mode	Air-Conditioning System	Side of Bus Facing Mike	Bus No. 732		Bus No. 736		Bus No. 737		Arithmetic Average		
				Before	After	Before	After	Before	After	For All Buses		% Reduction
1	CONSTANT SPEED	ON	CURB	97	78	82	73	90	73	89	78	12.4
2		ON	STREET	113	103	105	97	140	90	119	97	18.5
3		OFF	CURB	81	81	81	73	107	67	90	74	17.8
4		OFF	STREET	134	100	109	96	142	65	128	87	32.3
5	ACCELERATION UPSHIFT	ON	CURB	69	92	68	76	81	84	73	84	(15.1)
6		ON	STREET	102	106	95	85	126	111	108	101	6.4
7		OFF	CURB	62	92	65	76	76	81	68	83	(22.1)
8		OFF	STREET	96	111	109	89	130	107	112	102	8.9

Average % reduction for constant speed tests	20.3
Average % reduction for acceleration tests	(21.9)
Average % reduction for all tests	7.4

NOTE: Numbers in parentheses indicate an increase in the average loudness.

could be measured. Therefore, in an effort to provide data that could be considered typical (and not the best or worst possible), no effort was made to retest where these fluctuations were found. Several tests were repeated, however, when it was found that the shift points were not set in accordance with specifications or the transmission governor was noticed to be erratic and not repeatable. The overall effect of the air conditioner on these exterior noise measurements is judged to be minimal.

An overall summary of the exterior drive-by tests for all three buses is shown in Figure 24. The air conditioner made little difference; but the operating condition, cruise or transient, did. While marked reductions are evident at 20-mph constant speed, the reverse is indicated during the accel to upshift. This is due to the raising of the upshift engine speed per EIP recommendations.

B. Interior Sound Level Measurement

In an effort to provide some data which might relate to the Department of Labor (Walsh-Healey) Safety Criterion for Noise, measurements were made at three test points on the interior of the bus to establish the effect of the modification kit on interior noise levels. For this test, the following three test points were used:

(1) At the driver's ear.

(2) At the ear level of a passenger seated next to the aisle in the seat across from the rear door.

(3) At the ear level of a passenger seated in the center of the rear seat.

A General Radio Type 1565-A sound level meter and a General Radio Type 1562-A sound calibrator were used for these tests.

The results of the sound level measurements made inside the bus are presented in Table 3. These levels are the average of two separate readings for each test. The operating modes were identical to those used in the drive-by tests.

The "Average for All Buses" is not the arithmetic average of the three numbers but rather represents the average of the sound pressures for the three cases. Mathematically, this value may be derived using the following equation:

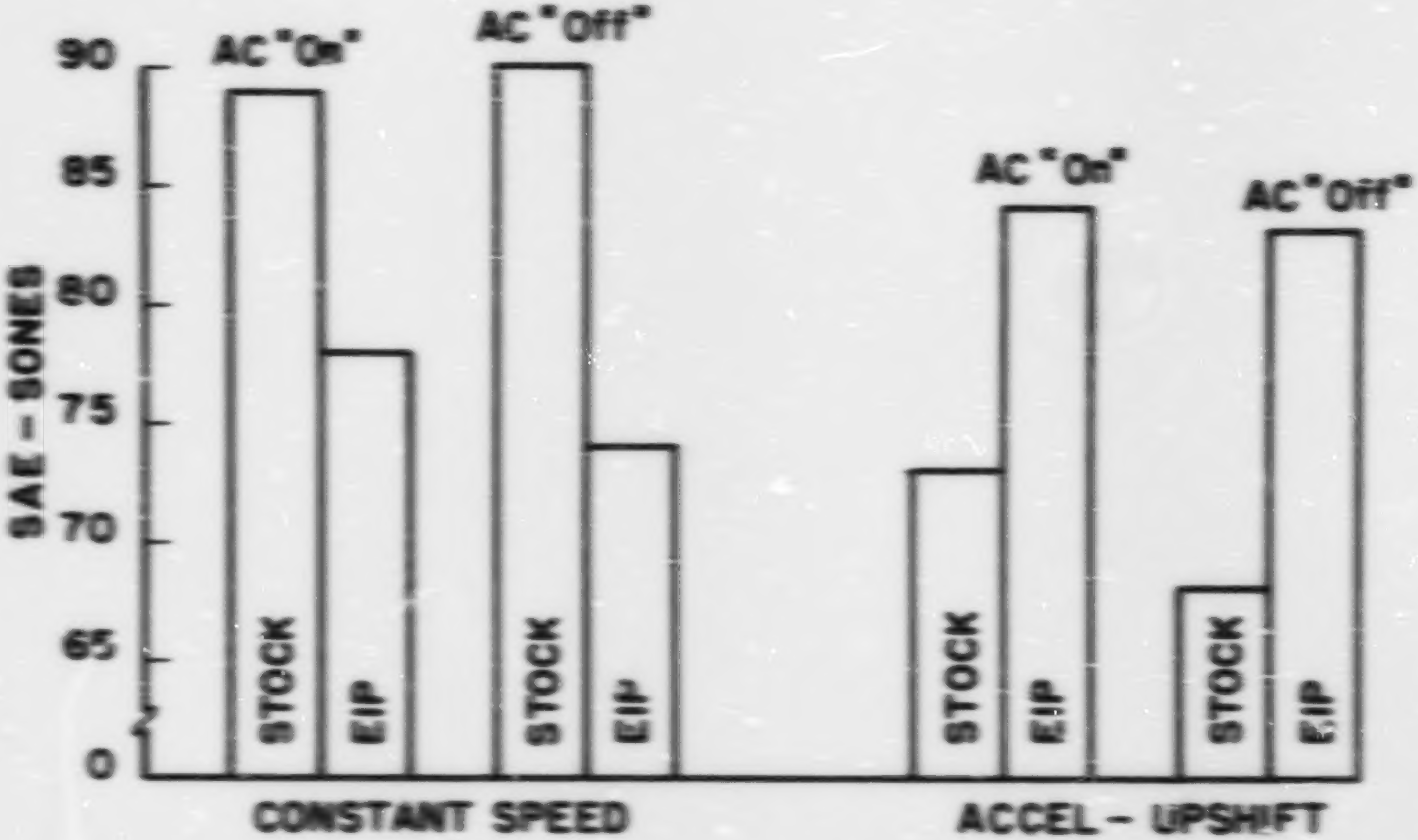


FIGURE 24. EXTERIOR SOUND--EIP VS STOCK CURBSIDE--ALL BUSES

TABLE 1. AVERAGE SOUND PRESSURE LEVEL FOR TWO-TESTS ON THE INTERIOR OF MUNICIPAL BUSES (IN dBA), GM-EIP FLEET TEST

Test No.	Test [illegible]	Air-Conditioning System	Test Point*	Bus No. 731		Bus No. 726		Bus No. 727		Average for All Buses		
				Before	After	Before	After	Before	After	Before	After	Reduction in dBA
1	CONSTANT SPEED	ON	DRIVER	78.0	74.5	77.0	73.5	77.2	74.0	77.4	74.0	3.4
2		ON	MID	80.4	78.0	78.5	76.4	80.7	78.5	79.9	78.1	1.8
3		ON	REAR	84.7	84.0	85.7	83.0	84.0	82.0	84.1	83.0	1.1
4		OFF	DRIVER	74.3	68.0	73.3	66.0	74.5	69.0	74.4	67.8	6.6
5		OFF	MID	74.5	71.0	76.9	70.0	77.7	73.0	76.4	71.4	5.0
6		OFF	REAR	83.5	75.5	80.5	75.0	84.0	78.2	82.9	76.3	6.5
7	ACCELERATION UPSHIFT	ON	DRIVER	77.5	77.0	75.0	74.0	76.1	78.5	76.4	76.0	0.4
8		ON	MID	81.0	78.5	78.8	77.0	81.8	81.0	80.6	79.0	1.6
9		ON	REAR	84.7	86.0	83.6	85.0	85.5	87.6	85.1	85.8	(0.7)**
10		OFF	DRIVER	74.0	69.0	71.0	66.0	73.0	74.0	72.6	70.1	2.5
11		OFF	MID	77.5	73.0	74.7	70.8	77.0	76.6	76.9	73.7	3.2
12		OFF	REAR	83.3	77.5	81.2	75.0	84.0	80.5	82.9	77.6	5.3

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*Driver – The microphone is located at the driver's ear.
Mid – The microphone is located at the ear level of a passenger seated next to the aisle across from the rear door of the bus.
Rear – The microphone is located at the level of a passenger seated in the center of the rear seat.
**Indicates an increase in the average level.

$$SPL_{ave} = 20 \log \left[\frac{10^{\left(\frac{SPL_1}{20}\right)} + 10^{\left(\frac{SPL_2}{20}\right)} + 10^{\left(\frac{SPL_3}{20}\right)}}{3} \right]$$

where

SPL_{ave} = the average sound pressure level in dBA re 0.00002-μ bar

and

SPL_N = the individual sound pressure levels for each bus in dBA re 0.00002-μ bar

On both the constant-speed and acceleration-upshift runs, the three-bus average interior sound-pressure levels in dBA were found to be lower in the EIP kit-equipped buses, except for test No. 9 where Buses 704 and 702 had higher readings at the rear seat (accel-upshift). The reductions noted were greatest during the constant-speed runs with the air conditioner inoperative. The air-conditioning system in these three vehicles is a significant noise source and had a noticeable effect on interior noise levels. The air-conditioning noise tended to mask the effect of the EIP kit. Although reductions on the order of 6 dBA were found during the 20-mph runs with AC "off," approximately half this improvement was noted when the AC was operating.

During the acceleration to upshift runs, the AC seemed to have about the same effect on the overall readings, i.e., about half, or less, of the reduction found with the AC "off." The same comments regarding the test repeatability, variability, and possible error inherent in the acceleration through upshift tests applies to these readings as during the exterior tests.

Figure 25 is an overall, 3-bus, summary of the interior sound measurements with and without air conditioner operative at constant speed during the accel-upshift condition. This bar chart representation illustrates the improvement possible by the EIP kit under both conditions and indicates how the amount of improvement is noticeably reduced when the air conditioner was operating.

C. Interior Loudness Test

To gage the apparent reduction in the interior noise levels afforded by the EIP modification kit, octave band data were taken at the ear level of a passenger seated at the rear of the bus. These data were then converted to sones in the manner illustrated in the SAE J672 test mentioned earlier. The sound measuring instruments were the same as those used during the exterior

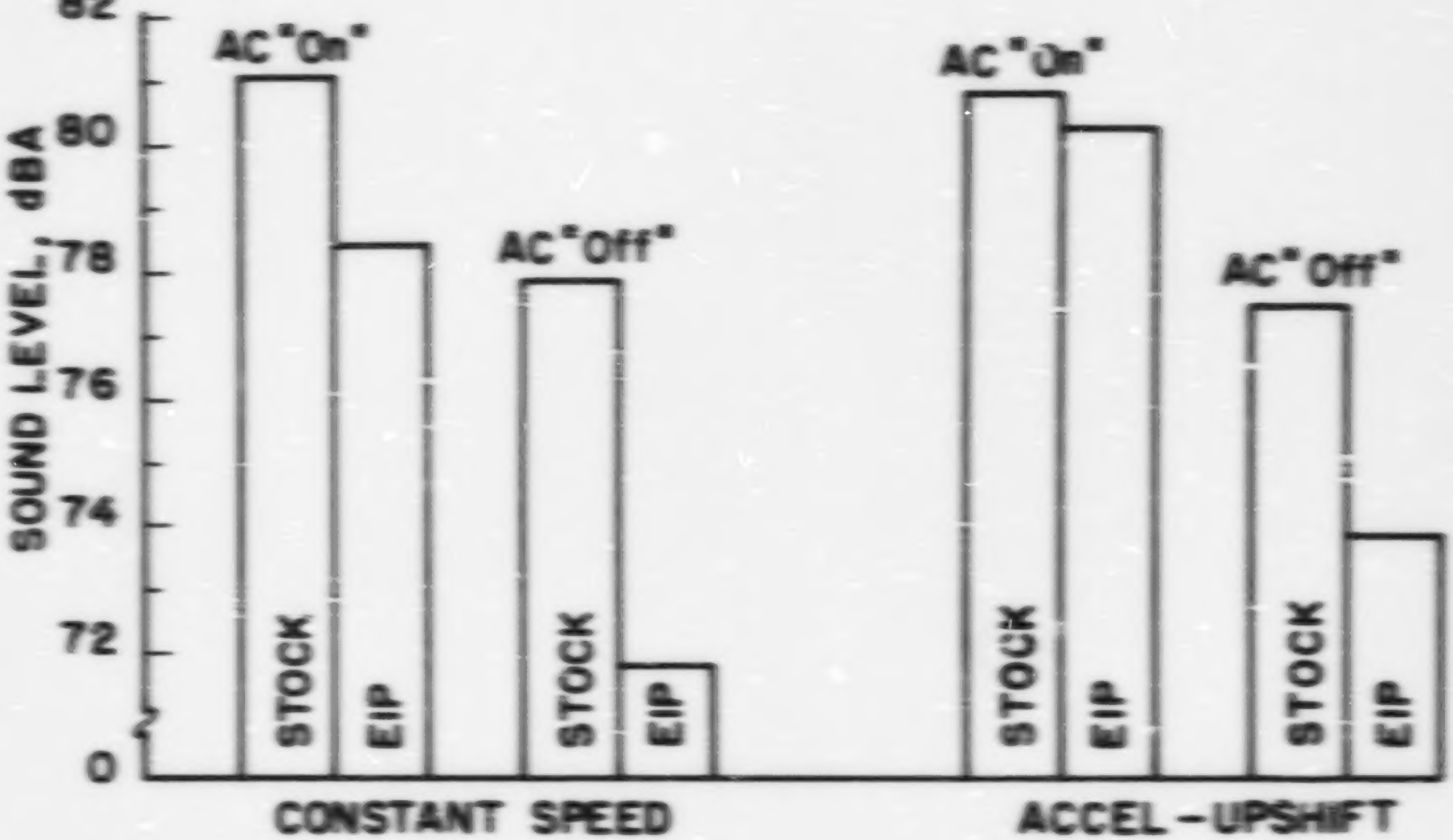

FIGURE 25. INTERIOR SOUND--EIP VS STOCK dBA ALL BUSES

drive-by tests, except they were operated from a large bus battery through a suitable inverter.

The last set of measurements, listed on Table 4, were loudness tests made at passenger ear level for a person seated in the middle of the rear seat of the bus. According to the octave band analysis, the apparent sound level was consistently reduced for all buses in both constant and transient modes. Greatest improvement was noted during the 30-mph cruise. Levels measured for Bus 704 (Test 1) were suspect. Although the data appear to actually represent test conditions, a slight difference in engine speed could account for the inconsistent result.

The literature on the Environmental Improvement Program suggests that there will be an interior noise reduction of 8 dBA on the 8V-71 and 4 dBA on the 6V-71-powered municipal coaches. Reductions of 4 dBA in interior noise were measured under certain conditions, namely, with the air conditioner inoperative. For buses having AC systems identical to the three units tested, it would appear that a reduction of less than 4 dBA would result if the measurements obtained with these three vehicles are to be considered typical. The increase in upshift speed is considered to be one reason for the diminished dBA reductions measured in this work. It would seem, as a passing observation, that the need to reduce the AC system noise should be the area of greatest concern for interior noise reduction. The noise from the air conditioning units on these three buses caused much greater differences in interior loudness and dBA readings than did the EIP kit even under optimum test conditions. Perhaps the EIP kit should also include a treatment for the AC system since more and more city buses are now air conditioned. This completes the noise test portion of the EIP fleet test.

TABLE 4. LOUDNESS LEVEL IN SONES AT THE BACK SEAT OF MUNICIPAL BUSES GM-EIP FLEET TEST

Test No.	Test At	Air-Conditioning System	Bus No. 702 Before	Bus No. 702 After	Bus No. 706 Before	Bus No. 706 After	Bus No. 707 Before	Bus No. 707 After	Arithmetic Avg., All Buses Before	Arithmetic Avg., All Buses After	% Reduction
1	CONSTANT SPEED	ON	113.0	70.0	106.0	155.0	154.0	85.0	133.5	77.5	42.0*
2		OFF	98.0	75.0	86.0	62.0	116.0	59.0	100.0	65.0	35.0
3	ACCEL UPSHIFT	ON	129.0	107.0	128.0	121.5	153.0	135.0	135.0	121.0	10.4
4		OFF	104.0	75.0	104.0	88.0	110.5	106.0	106.0	91.0	14.2

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*Bus 706 data not included in this average because data are suspect.

IV. RESULTS OF TWO-YEAR DEMONSTRATION

Odor, smoke and gaseous emissions inspections were made five times during the two-year period of test per the following schedule.

Inspection	Date	Test Miles*	Engine Hours*	Test Months*
Initial	October, 1970	1,000	100	0
First Interim	April, 1971	25,000	2000	6
Second Interim	August, 1971	40,000	3500	10
Third Interim	February, 1972	80,000	6500	16
Final	November, 1972	115,000	9100	24

*Rounded off average

The measurements, made in a back-to-back manner to facilitate direct comparison, are described first for odor, then smoke, followed by selected chemical gaseous measurements during the odor tests with cyclic emissions (13-mode) listed last. In each case, the stock configuration (stock muffler and used 60S injectors at 1,470) is listed first, followed by the simple replacement of injectors with 60 LSN (at 1,470) and then with the EIP configuration of catalytic muffler plus 60 LSN injectors. Shortly after the second interim inspection, the catalytic muffler, on the advice and consent of the Project Officer, was deleted from the test program. Accordingly, the third interim and final inspection results are for the LSN and S injectors both with stock muffler.

A. Odor

The odor evaluations indicated a significant reduction when the improved injectors were used in all buses under most all conditions with idle showing less improvement than the other conditions. This overall result is illustrated in Figures 25 through 28 which are bar charts representing the sum of "D" + "B" + "O" + "A" + "P" panel ratings. Each figure, one for each bus, shows all six operating conditions and presents on a comparative basis the ratings for the stock muffler plus LSN injectors and catalytic muffler plus LSN units relative to the unmodified bus odor. A review of these bar charts indicates the generally consistent improvement in odor reduction available from the LSN injectors while the catalytic muffler lacked noticeable improvement in exhaust odor. Note that the third interim and final inspection comparisons are for the LSN versus the stock condition only since the catalytic muffler had been dropped from the test.

These trends are based on the extensive odor data tabulated in summary form in Tables 5, 6, and 7 for Buses 702, 704, and 707, respectively. The presence of asterisk values for the U_s nonparametric statistical test for difference indicates the net change to be within the spread of the experimental data and not statistically different. There is no doubt that the LSN

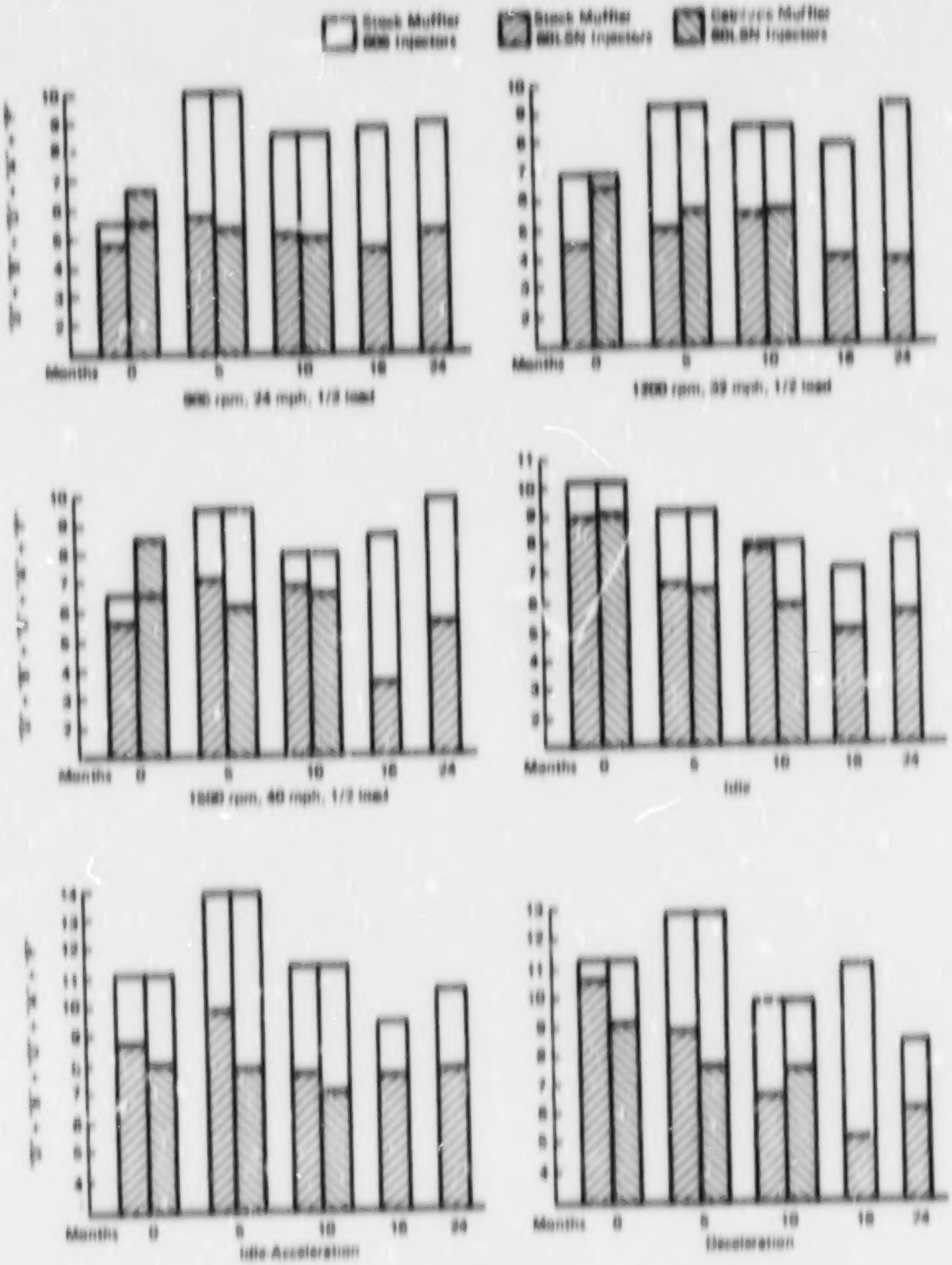


FIGURE 26. ODOR EVALUATION COMPARISON - BUS 702
TWO YEAR SUMMARY

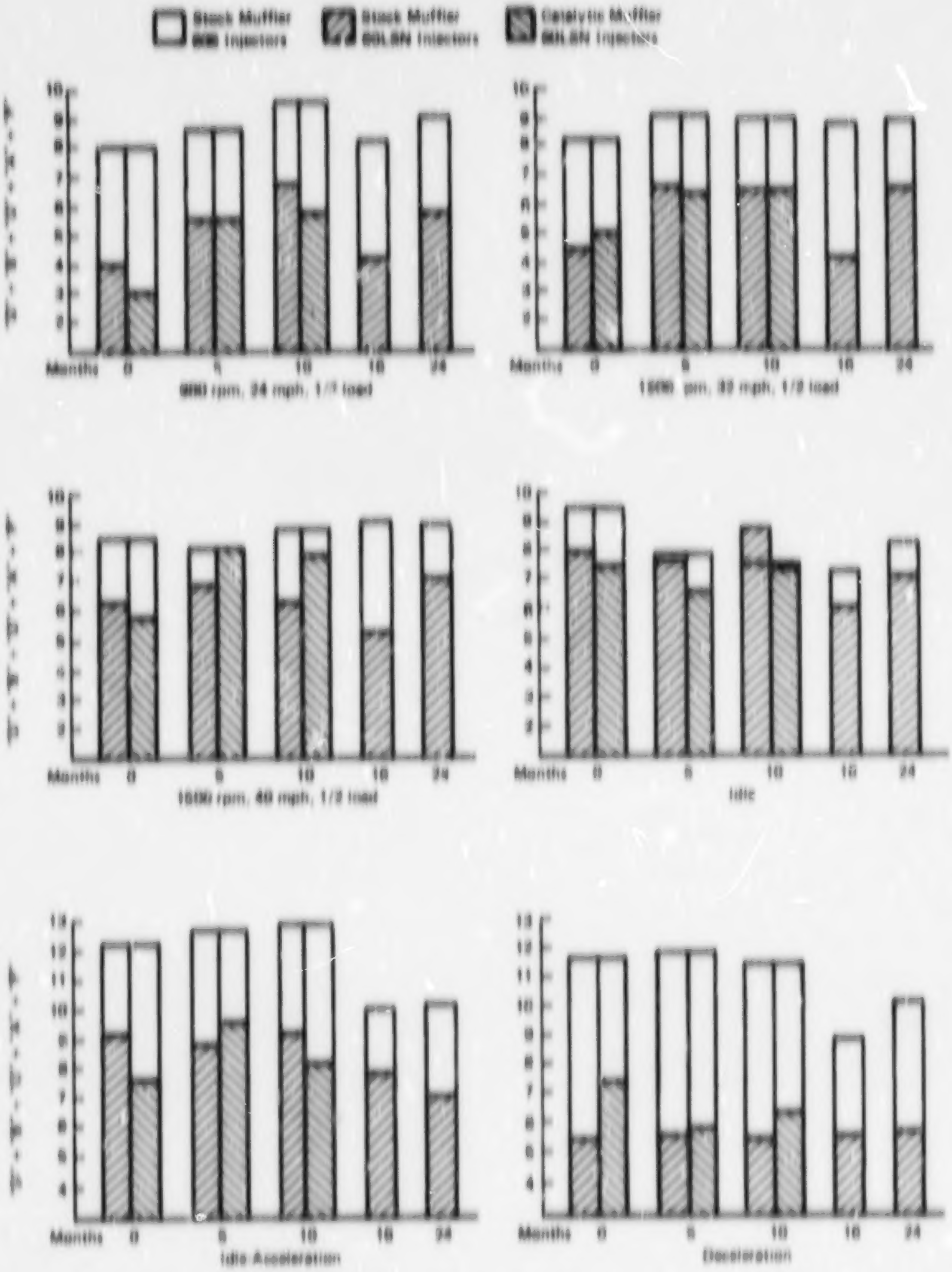


FIGURE 27. ODOR EVALUATION COMPARISON - BUS 704
TWO YEAR SUMMARY

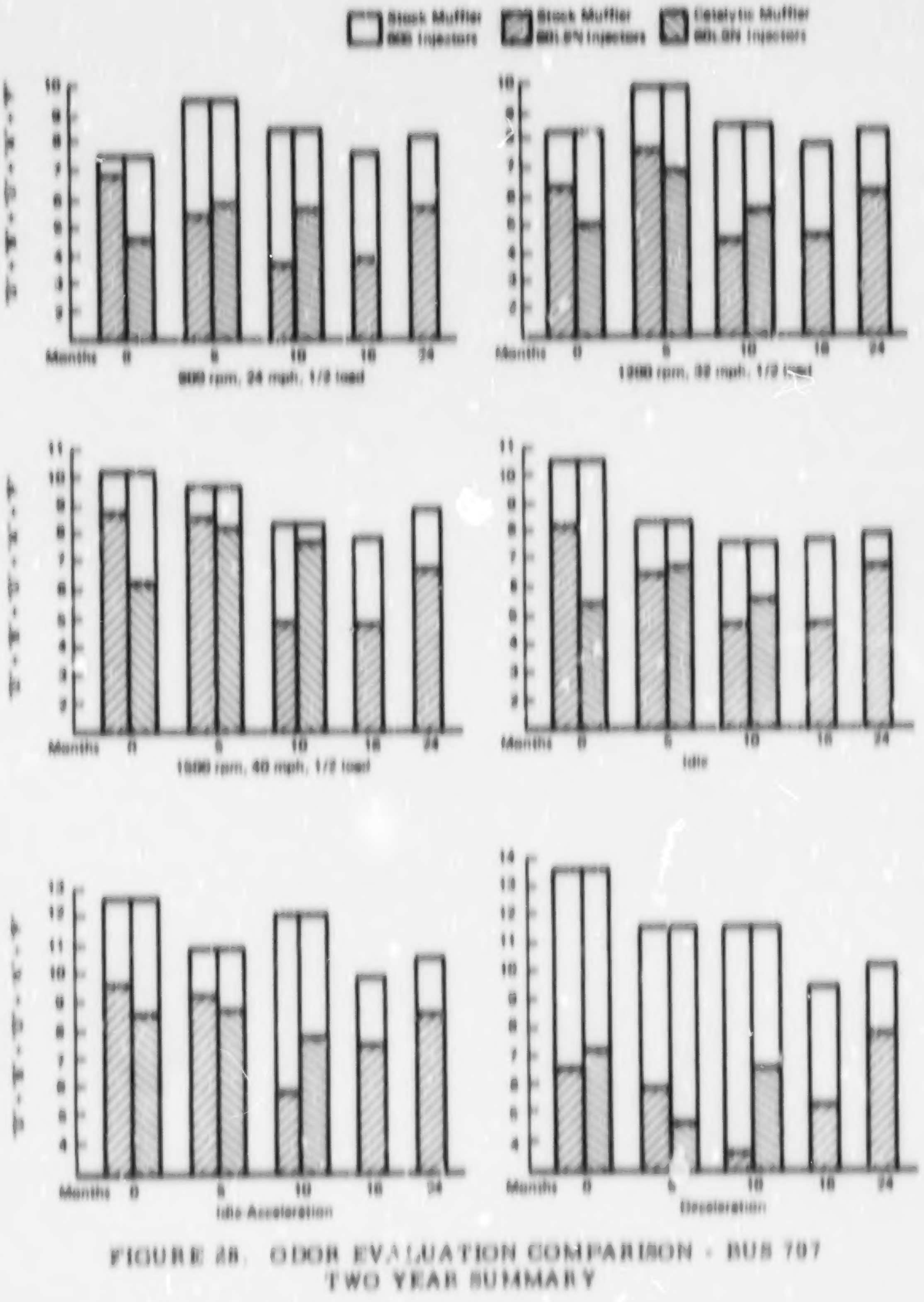


FIGURE 28. ODOR EVALUATION COMPARISON - BUS 707
TWO YEAR SUMMARY

TABLE 5. OVERALL SUMMARY OF ODOR EVALUATIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 702)

Operating Condition	Test Miles	Engine Hours	Test Date	Test Configuration	"D" Composite		"B" Burnt		"O" Oily		"A" Aromatic		"P" Pungent	
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock, [illegible] Modification Net Change [illegible] Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

TABLE 5. (Cont.) OVERALL SUMMARY OF ODOR EVALUATIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 702)

Operating Condition	Test Miles	Engine Hours	Test Date	Test Configuration	"D" Composite Modifications		"B" Burnt Modifications		"O" Oily Modifications		"A" Aromatic Modifications		"P" Pungent Modifications	
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	1,750	162	10/1/70 9/25, 9/28/70	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	32,063	1,731	4/30/71 4/28, 4/27/71	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	61,700	3,717	8/20/71 8/19, 8/17/71	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	80,115	5,475	3/16/72 3/13/72	Stock, B Modification Net Change t_2 Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	100,650	6,670	11/16/72 11/15/72	Stock, B Modification Net Change t_2 Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
Idle - Accel	1,750	162	10/1/70 9/25, 9/28/70	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	32,063	1,731	4/30/71 4/28, 4/27/71	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	61,700	3,717	8/20/71 8/19, 8/17/71	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	80,115	5,475	3/16/72 3/13/72	Stock, B Modification Net Change t_2 Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	100,650	6,670	11/16/72 11/15/72	Stock, B Modification Net Change t_2 Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
Decel	1,750	162	10/1/70 9/25, 9/28/70	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	32,063	1,731	4/30/71 4/28, 4/27/71	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	61,700	3,717	8/20/71 8/19, 8/17/71	Stock, B Modification Net Change t_2 Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	80,115	5,475	3/16/72 3/13/72	Stock, B Modification Net Change t_2 Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	100,650	6,670	11/16/72 11/15/72	Stock, B Modification Net Change t_2 Statistic	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

TABLE 6. OVERALL SUMMARY OF ODOR EVALUATIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 704)

Operating Condition	Test Miles	Engine Hours	Test Date	Test Configuration	"D" Composite Modification		"B" Burnt Modification		"O" Oily Modification		"A" Aromatic Modification		"P" Pungent Modification	
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

TABLE 6. (Cont.) OVERALL SUMMARY OF ODOR EVALUATIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 704)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	"D" Composite		"B" Burnt		"O" Oily		"A" Aromatic		"P" Pungent	
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
Idle Accel	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
Decel	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock Modification Net Change [illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

TABLE 7. OVERALL SUMMARY OF ODOR EVALUATIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 707)

Operating Condition	Test Miles	Engine Hours	Test Date	Test Configuration	"D" Composite Evaluations		"B" Burnt Evaluations		"O" Oily Evaluations		"A" Aromatic Evaluations		"P" Pungent Evaluations	
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	911	99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	911	99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	911	99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

TABLE 7. (Cont.) OVERALL SUMMARY OF ODOR EVALUATIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 707)

[illegible]

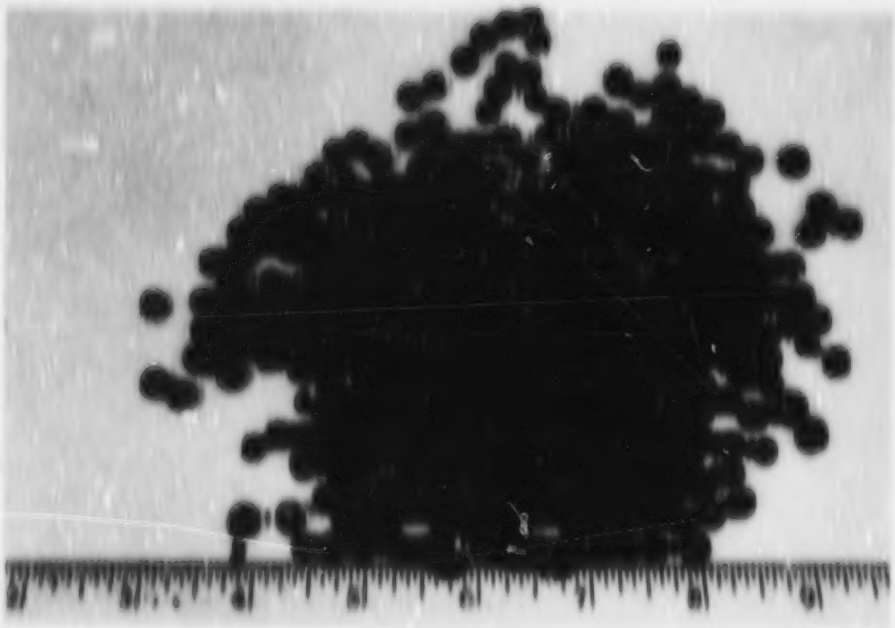
injectors are doing an excellent job, are mainly consistent, and most reductions are not only substantially but significantly different.

In contrast, the catalytic muffler, operated in conjunction with the improved injectors, had little or no overall net positive effect on reducing exhaust odor. In some instances, specifically the initial tests of Bus 707, the catalytic muffler seemed to be somewhat effective. But, after 25,739 miles, the initial improvements disappeared and the catalytic muffler was found to be largely ineffective as that found for the other two buses at the initial and first interim inspection. It may have been that the catalyst was new and still effective after the 911 miles of operation (99 hr). The catalyst on Bus 707 apparently was the cause of higher odor after 39,374 miles under nearly all test conditions. This was the second interim inspection for the bus and the final test for the catalyst charge intended for 40,000 miles of operation.

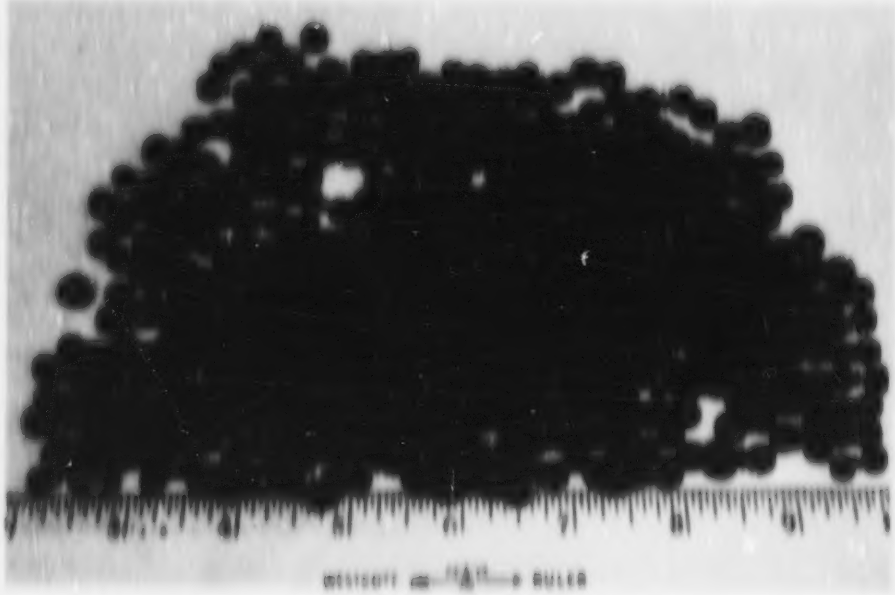
It has been our experience that sometimes a more penetrating pungent, sour odor may occur from a catalytic muffler which has, in the past, been attributed to partial conversion of less smelly compounds into those more noticeable. The interesting action of the catalyst under idle on Bus 707, and, to a lesser extent, 704 initial tests, may be attributed to the residual heat stored in the 40-lb charge of catalyst in the muffler triggering reactions even though the inlet gas temperature is around 225° to 250° F.

Since the catalytic muffler was expected to have its greatest impact on noticeable odor, the results of inspection and analysis during the first interim and after the second interim tests are included in this subsection. Figure 29 shows new and used catalyst material after 36,650 miles of operation. More broken pieces were found in the used catalyst and, of course, the appearance was a shiny black compared to the usual dull gray appearance when new. The catalyst poured fairly freely from the muffler and when weighed was found to have only slightly attrited during the first period of operation. Table 8 lists the catalyst charge weight when new, according to GM Truck and Coach Division, and the screen size of a sample of new material. The used catalyst data are listed next and indicate essentially no change in catalyst charge weight while screen size indicates some attrition and size reduction.

At the initial inspection, it was found that the muffler was completely full of catalyst material. It may have been that more than the 40-lb charge was installed in the unit during installation and it is uncertain whether the material was preweighed. This is a small point, however, as the catalytic muffler was found to be essentially as full at the first and second interim as at the initial inspection. The catalyst substrate, nominal 1/4-in.-diameter alumina (Al_2O_3) spheres, appears to be a hard, tough formulation and resistant to excessive abrasion, erosion, or thermal spalling and cracking. It is not certain whether the Zone 61 copper oxide catalyst, carried mainly



New Catalyst



Used Catalyst

FIGURE 29. NEW AND USED CATALYST MATERIAL

TABLE 8. NEW AND USED CATALYST INSPECTION DATA

New Catalyst Data

Charge when new, lb		40*
Screen Size when new		86,5% ≥ 1/4 inch
	1/8 inch ≤	13,5% ≤ 1/4 inch

Used Catalyst Data

Bus 702 - 22,962 miles - First Interim Inspection		
Charge, lb		42,25
Screen size		53% ≥ 1/4 inch
	1/8 inch ≤	47% ≤ 1/4 inch
Bus 704 - 35,193 miles - First Interim Inspection		
Charge, lb		41,25
Screen size		64% ≥ 1/4 inch
	1/8 inch ≤	50% ≤ 1/4 inch
Bus 707 - 26,650 miles - First Interim Inspection		
Charge, lb		39,5
Screen size		50% ≥ 1/4 inch
	1/8 inch ≤	50% ≤ 1/4 inch
Bus 702 - 45,706 miles - Second Interim Inspection		
Charge lb		41,5
Screen size		49,2% ≥ 1/4 inch
	1/8 inch ≤	50,8% ≤ 1/4 inch
Bus 704 - 42,274 miles - Second Interim Inspection		
Charge, lb		40,7
Screen size		56,0% ≥ 1/4 inch
	1/8 inch ≤	44,0% ≤ 1/4 inch
Bus 707 - 39,374 miles - Second Interim Inspection		
Charge, lb		39,0
Screen size		47,7% ≥ 1/4 inch
	1/8 inch ≤	52,3 ≤ 1/4 inch

* Per GM Truck and Coach Division.

on the surface as a coating has been worn off or otherwise rendered ineffective by this type of service. According to Davison Chemical Division of W. R. Grace, about 10 to 15 percent of the catalyst coating penetrates the alumina substrate.

The odor panel results leave little doubt that the catalytic muffler is ineffective. The exact reason for lack of performance is not known from these studies. In any event, it was decided to discontinue the catalytic muffler in the two-year demonstration. This decision was made with the knowledge of all parties concerned including the EPA Project Officer and representatives of GM Truck and Coach and DOT. As a result, no further tests or analysis was made of the catalytic devices at the third interim and final inspections.

Contained in Appendix B are the 4-run summaries of odor panel ratings. Each table summarizes the results for one odor panel day and one day was used for evaluation of each treatment of each bus. These more detailed results are included for further study of run-to-run repeatability, variability, etc.

B. Smoke

A summary of the simulated Federal Smoke Test results is contained on Table 9. To place the "a" acceleration, "b" lugdown and "c" peak factors into perspective, the limit of visibility is normally 3 to 4 percent opacity. This means that only Bus 704, in a stock configuration, produced enough smoke during the initial inspection to be particularly noticeably (6 to 8 percent). The LSN injectors were quite consistent during the initial inspection in reducing smoke. With the exception of Bus 707, this improvement was also found at the first interim inspection. Bus 707 seemed to produce slightly more smoke with LSN versus the stock injectors. One possible reason for this behavior will be discussed later in this section.

Bus 702 experienced difficulty with excessive smoke between the second and third interim inspections. The vehicle was immediately brought to the Emissions Research Laboratory and operated on the heavy-duty dynamometer under a simulated Federal smoke test. It did have higher than normal smoke for this particular bus and after some investigation, including diagnosis with respect to power output, fuel input, inlet and exhaust restrictions, etc., it was found that the LSN injector in cylinder number 3 on the right bank had failed after approximately 61,000 miles since installation as part of the EIP kit. This injector, replaced on November 17, 1971, would stay in an open position and thereby keep the governor from repositioning the rack properly. This caused an excessive fuel rate and hence excessive smoke levels. After replacing the injector with a rebuilt 60 LSN unit, set to the same timing as the faulty injector on removal (1.477), the smoke reduced to approximately the level at the previous scheduled inspection. Bus

TABLE 9. OVERALL SUMMARY OF SIMULATED FEDERAL SMOKE TEST
TWO-YEAR FLEET TEST OF GM EIP KIT

[illegible]

707 was also given a smoke test, on November 16, 1971, and the smoke was similar to the previous scheduled inspection.

A concerned citizen noticed excessive smoke from Bus 704, requiring an unscheduled smoke inspection on February 10, 1972. In order to bring the as-received "a" of 9.2 and "b" of 8.6 percent opacity down, a complete adjustment of injector setting and rack governor mechanism was necessary along with replacement of air filter element. Each item has a small effect separately, with the final result a more acceptable 4.1 percent "a" and 3.6 percent "b" factor. This required maintenance was done after 72,339 test miles, 17 test months, and 5806 engine test hours.

The vertical stack makes the smoke easily visible to the observer. Although the original intent was to operate the entire two-year test without any maintenance to the injectors, etc., the corrections were required to continue Busses 702 and 704 in the program.

Returning to Table 9, the second and third interim and final inspection results are listed for each bus. Note that Bus 702, at the third interim inspection, was run two ways; as-received and after replacement of a dirty intake air cleaner. The smoke was measurably lower after the air cleaner element was replaced with a new one.

Because of the general concern over completing the planned two years of test without scheduled engine maintenance other than oil and fuel filter change and crankcase oil change, an adjustment of all buses was made in April, 1973, after about 18 months of operation. The buses had accumulated about 90,000 miles and smoke tests were made before and after injector adjustment to 1.470. Table 10 lists the Federal smoke factors and the power curve smoke and power measured. Although the Federal smoke was not substantially lowered, it was felt to be in the interest of the test to make such an adjustment.

The injector settings and their increase are listed on Table 11. The increase is based on the zero hour 1.470 inch setting. A review of these data indicates only a very nominal amount of wear during the first period of operation except for two injectors, left bank, cylinders 1 and 2 of Bus 707, which had substantial increases. This could well account for the increased smoke from this engine as it represents a maladjusted injector. The larger the setting, the later the start of fuel injection and this is known to increase engine smoke and to decrease nitric oxide. Please refer to Section VIII of Part IV final report (Ref. 6) for details on injector timing experiments. The GM unit injector is actuated through a mechanical linkage system which is subject to more or less wear with operation. According to the San Antonio Transit System, the bronze rocker arm roller that actuates the injector can wear rapidly, resulting in late injection. The increased opening pressure of the "N"-type injector has caused more rapid

TABLE 10. SMOKE TEST RESULTS BEFORE AND AFTER UNSCHEDULED ADJUSTMENT OF LSN INJECTORS TO 1.476

Injector Setting	Federal Smoke, % "a"	Federal Smoke, % "b"	Federal Smoke, % "c"		Engine rpm 1000	Engine rpm 1200	Engine rpm 1400	Engine rpm 1600	Engine rpm 1800	Engine rpm 2000
				4/26/72, Bus 702, 18 months, 92,162 miles, 7,181 engine hours						
As				Hp	66	75	85	88	90	88
Received	5.1	6.0	6.7	Smoke, %	8.8	6.9	5.4	4.0	3.3	3.9
After				Hp	66	76	83	85	90	90
Adjustment	4.2	5.1	5.4	Smoke, %	6.8	5.2	4.3	2.6	2.3	2.1
				4/27/72, Bus 704, 18 months, 89,548 miles, 6,721 engine hours						
As				Hp	75	85	92	97	100	96
Received	5.9	5.3	9.2	Smoke, %	7.3	5.9	4.8	3.7	3.[illegible]	2.8
After				Hp	70	85	87	94	100	97
Adjustment	4.1	4.3	5.3	Smoke, %	5.6	5.0	4.3	3.2	3.0	2.8
				4/28/72, Bus 707, 18 months, 89,251 miles, 7,535 engine hours						
As				Hp	70	84	88	90	92	94
Received	4.9	4.6	5.8	Smoke, %	7.5	5.1	4.7	4.0	3.3	3.2
After				Hp	66	80	85	92	92	86
Adjustment	4.1	3.4	6.0	Smoke, %	5.8	3.9	2.9	3.1	3.0	3.6

TABLE 11. LSN INJECTOR SETTINGS COMPARED TO PRESET 1.470 INCH
(AS-RECEIVED FROM FIELD OPERATION)

Cyl. No.	First Interim Setting	First Interim Increase	Second Interim Setting	Second Interim Increase	Third Interim Setting	Third Interim Increase	Unscheduled Smoke Test Setting	Unscheduled Smoke Test Increase	Final Setting	Final Increase
					BUS 707					
L-1	1.483	0.013	1.485	0.015	1.486	0.016	1.488	0.018	1.479	0.009
L-2	1.490	0.020	1.492	0.022	1.495	0.025	1.497	0.027	1.479	0.009
L-3	1.474	0.004	1.477	0.007	1.485	0.015	1.491	0.021	1.479	0.009
R-1	1.471	0.001	1.480	0.010	1.488	0.018	1.491	0.021	1.474	0.004
R-2	1.479	0.009	1.484	0.014	1.489	0.019	1.493	0.023	1.477	0.007
R-3	1.474	0.004	1.479	0.009	1.486	0.016	1.492	0.022	1.476	0.006
Avg. Increase		0.009		0.013		0.018		0.022		0.007
					BUS 704					
L-1	1.474	0.004	1.477	0.007	1.484	0.014	1.490	0.020	1.482	0.012
L-2	1.472	0.002	1.480	0.010	1.482	0.012	1.487	0.017	1.481	0.011
L-3	1.474	0.004	1.480	0.010	1.486	0.016	1.490	0.020	1.482	0.012
R-1	1.472	0.002	1.475	0.005	1.485	0.015	1.490	0.020	1.481	0.011
R-2	1.474	0.004	1.482	0.012	1.482	0.012	1.490	0.020	1.486	0.016
R-3	1.472	0.002	1.482	0.012	1.486	0.016	1.490	0.020	1.482	0.012
Avg. Increase		0.003		0.009		0.014		0.019		0.012
					BUS 702[1]					
L-1	1.473	0.003	1.476	0.006	1.476	0.006	1.478	0.008	1.473	0.003
L-2	1.474	0.004	1.477	0.007	1.479	0.009	1.480	0.010	1.472	0.002
L-3	1.474	0.004	1.478	0.008	1.481	0.011	1.483	0.013	1.475	0.005
R-1	1.472	0.002	1.475	0.005	1.477	0.007	1.480	0.010	1.475	0.005
R-2	1.470	—	1.474	0.004	1.478	0.008	1.479	0.009	1.472	0.002
R-3	1.475	0.005	1.476	0.006	1.482	0.012	1.486	0.016	1.475	0.005
Avg. Increase		0.003		0.006		0.009		0.011		0.004

[1] Bus 702 injectors returned to 1.470 on February 10, 1972, after 81,490 miles.

wear of this component than with "S"-type injectors.

Figures 30 through 32 depict the "a", "b" and "c" Federal smoke factors with test mileage, months and engine hours. The solid line is the plot of the crown valve or S injectors while the broken line is the plot of the LSN injectors. These tests were with the conventional stock muffler installed. Recall that the S injectors were always set to 1,470 while the LSN injectors began the test at 1,470 injector setting per the EIP recommendation and were not readjusted back to 1,470 during the initial 18 months of the demonstration except for Bus 702 on February 10, 1972.

Please also recall that 3 to 4 percent opacity on the PHS smokemeter is at the limit of visibility. The smoke was held on all three buses to nearly this level or less throughout the 24 month test period according to the Figure 30-32 plots. A substantial improvement in smoke was found with Bus 704, for example, in which an easily noticeable level of 8 to 10 percent opacity was reduced to half those levels and could be considered to have no visible smoke. This is no longer the goal of the city bus but is seen more as a requirement, especially when vertical stacks are employed.

Figures 33, 34, and 35 are reproductions of a single acceleration-lugdown smoke test procedure for units 702, 704, and 707, respectively. Each figure contains a chart taken during the first interim inspection with LSN injectors and stock muffler installed. The most important aspect of these traces is the very low smoke output of the engines with LSN injectors after about 25,000 miles of operation. Appendix F contains Federal smoke data sheets that list the actual readings from the smoke charts and indicate the calculation of the "a", "b" and "c" factors.

Table 12 is a tabulation of the smoke and power measurements taken over a range of steady state engine speeds from 1000 to 2000 rpm in 200-rpm increments. The smoke measurements confirm the lugdown readings of the Federal Test Procedure. The characteristic of this engine to increase in smoke discharge as the engine speed is decreased is unchanged by the EIP kit, catalytic muffler, or LSN injectors. A brief analysis of the power measurements indicate about a 10 to 15 percent loss in rear wheel power over the two year period regardless of whether S or LSN injectors were used.

C. Gaseous Emissions

The results in this section include data obtained simultaneously with the odor panel runs and the 13-mode schedule.

1. Odor Run Data

Simultaneous with odor panel measurements made during the four

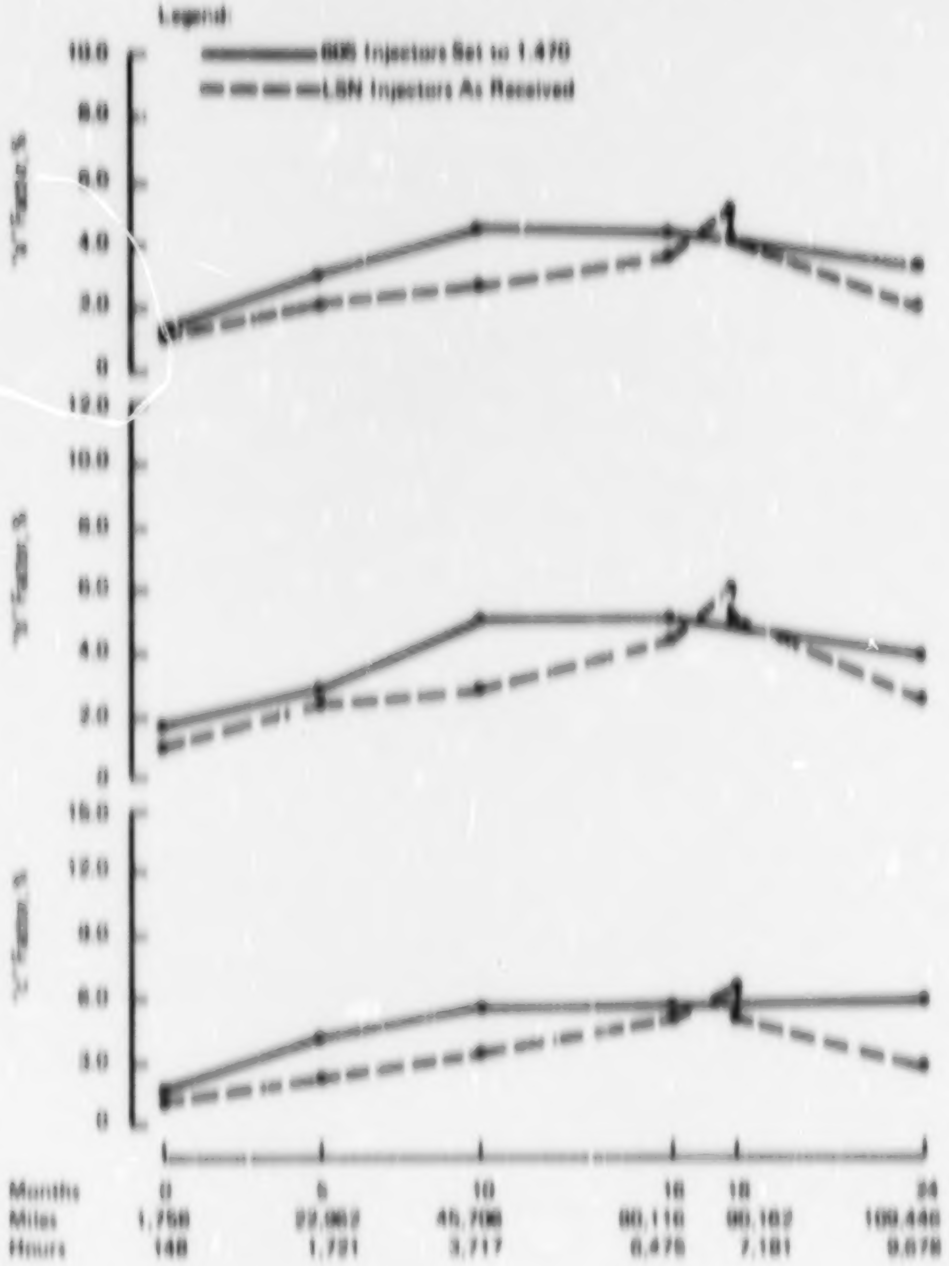


FIGURE 30. FEDERAL SMOKE FACTORS DURING TWO-YEAR TEST
(Bus 702)

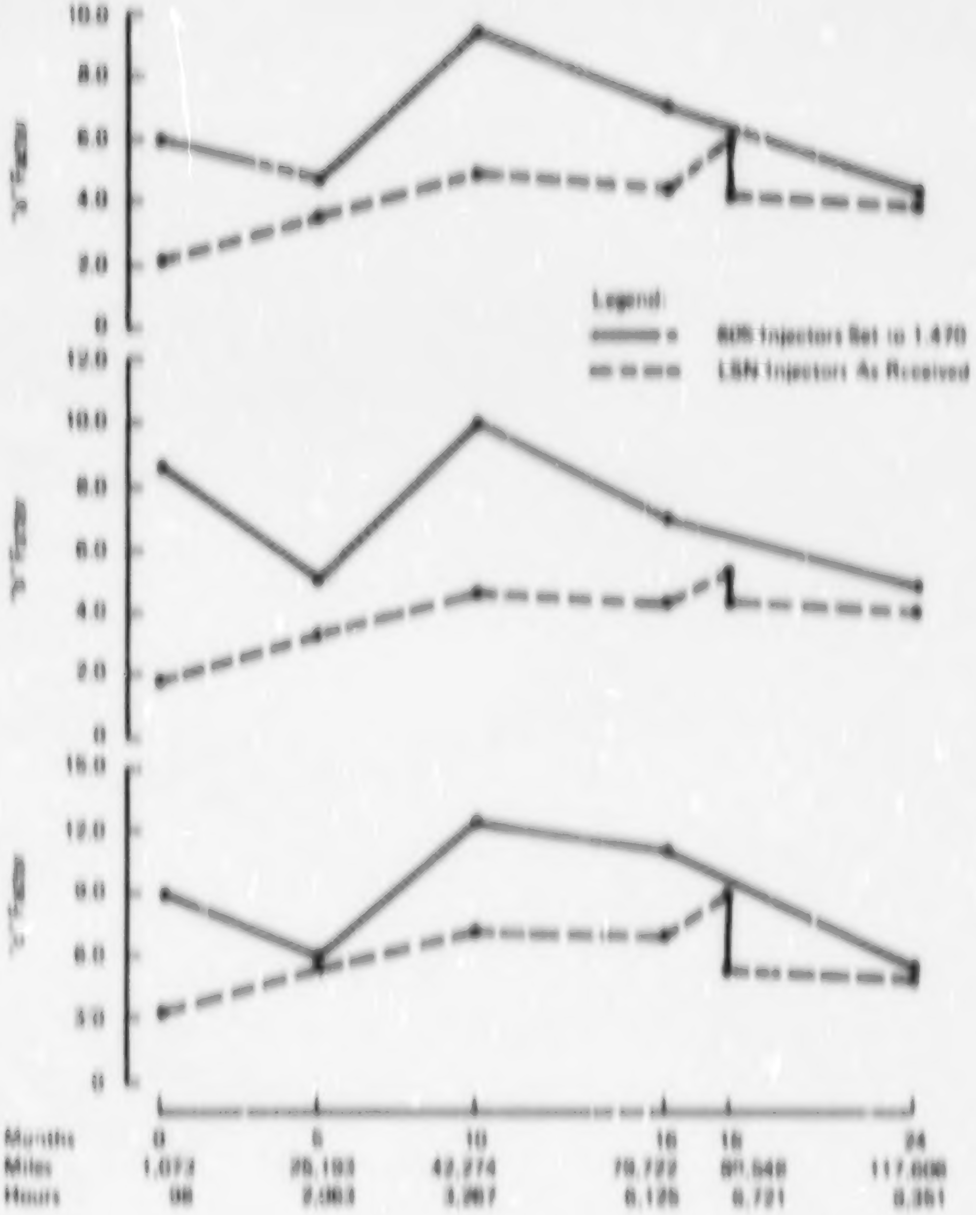


FIGURE 31. FEDERAL SMOKE FACTORS DURING TWO-YEAR TEST (Bus 704)

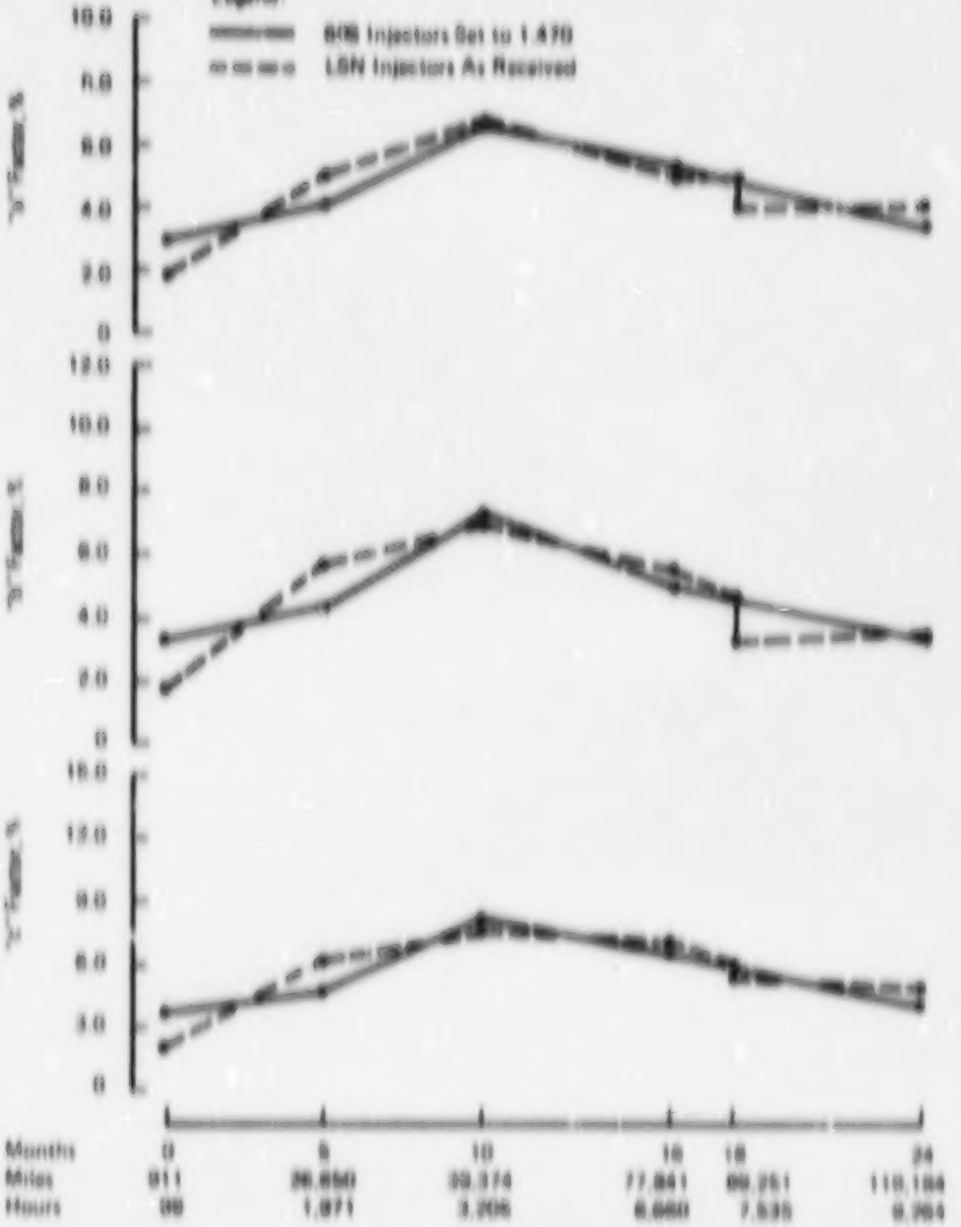


FIGURE 32. FEDERAL SMOKE FACTORS DURING TWO-YEAR TEST
(Bus 707)

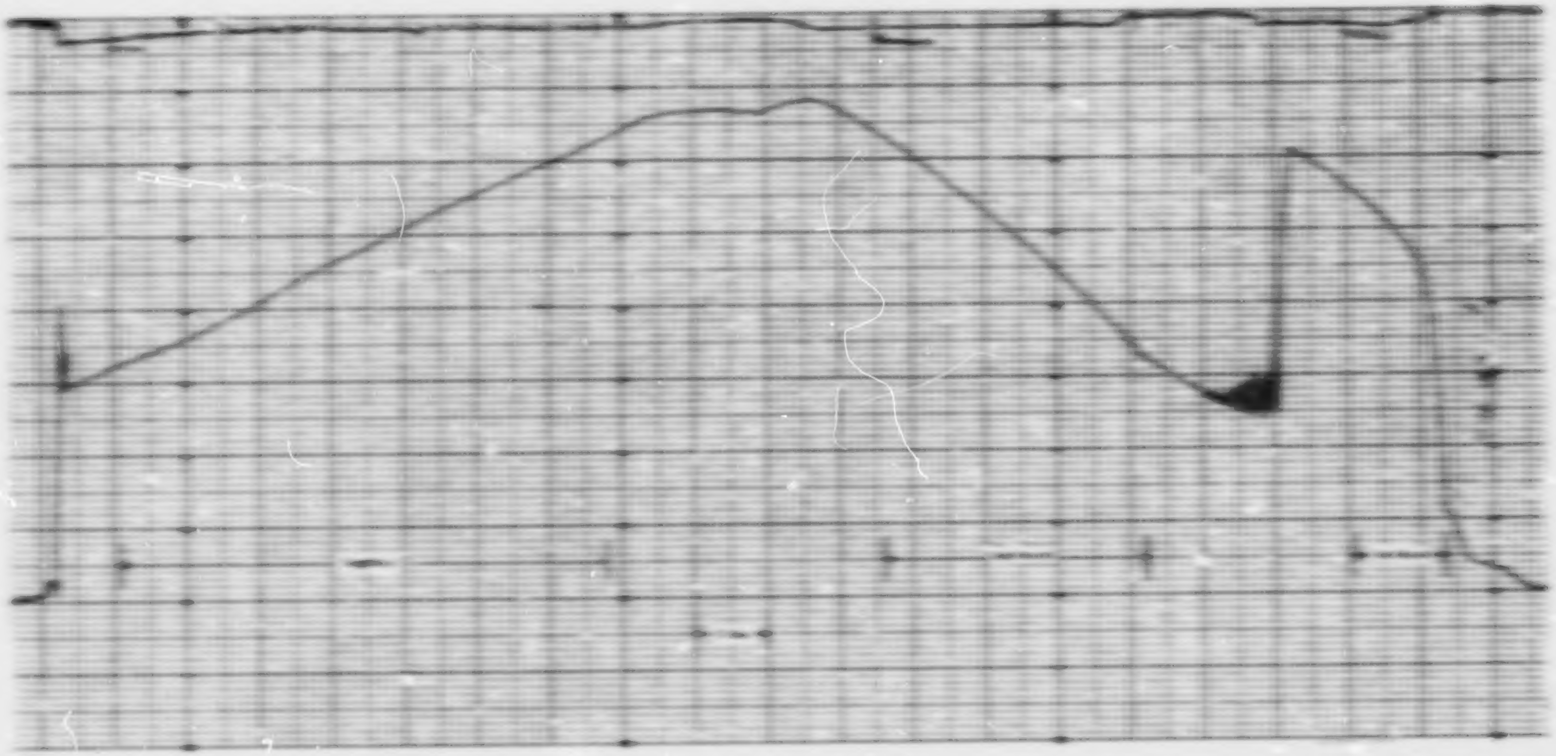


Chart Calibration--
100% Chart = 2600 RPM
0% Chart = 100% Smoke Opacity

Chart Reading--
Start/End 1st Accel:
31% to 75%

Start/End 2nd Accel:
52.5% to 83%
Start/End Lugdown:
83% to 52.5%

FIGURE 33. REPRESENTATIVE ACCEL--LUGDOWN SMOKE TRACE--FUS 702
FIRST INTERIM INSPECTION--LSN INJECTORS

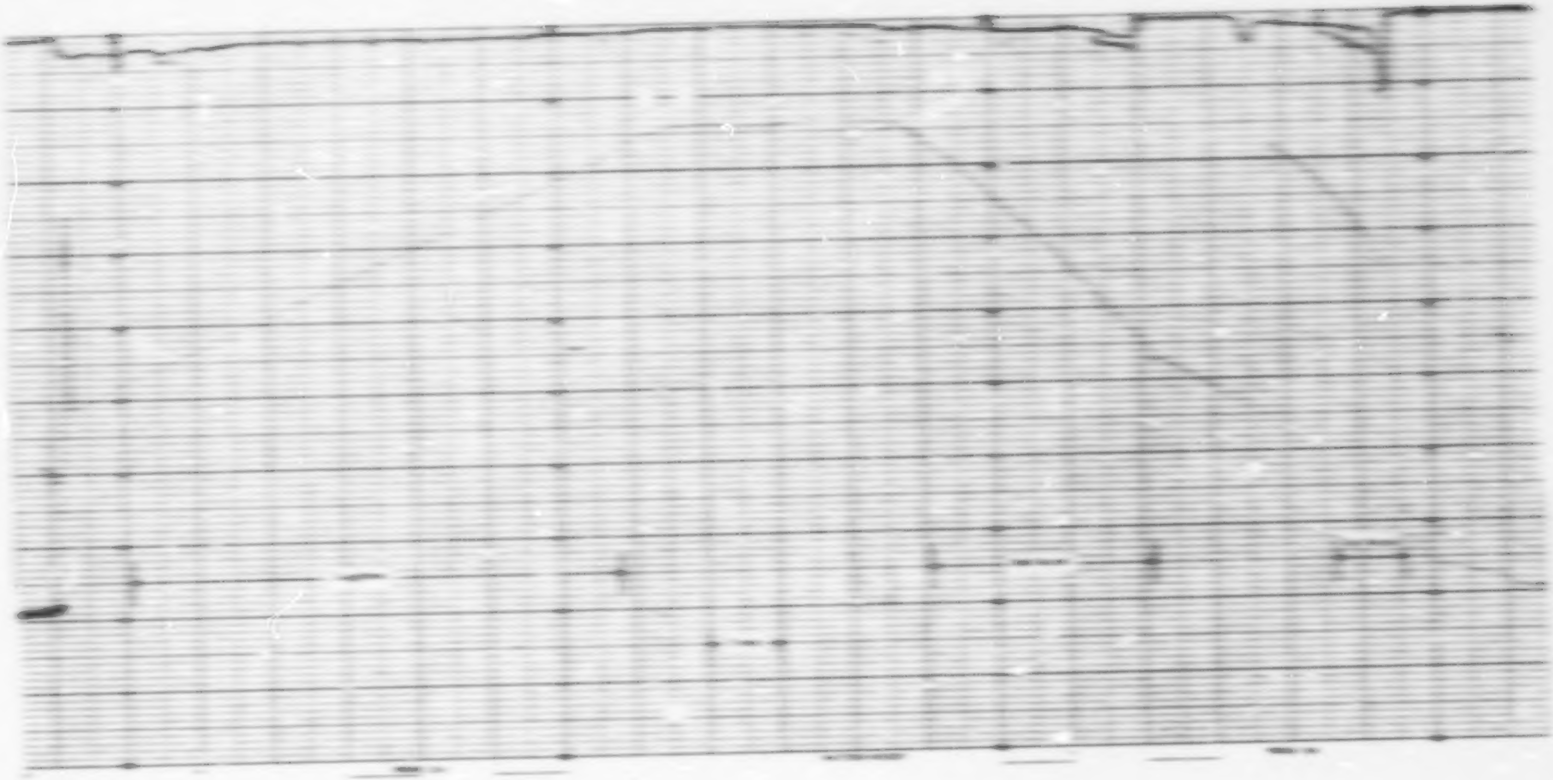


Chart Calibration—
100% Chart = 2400 RPM
0% Chart = 100% Smoke Opacity

Chart Reading—
Start/End 1st Accel:
31% to 75%

Start/End 2nd Accel:
52.5% to 83%
Start/End Lugdown:
83% to 52.5%

FIGURE 34. REPRESENTATIVE ACCEL—LUGDOWN SMOKE TRACE—BUS 734
FIRST INTERIM INSPECTION—LSN INJECTORS

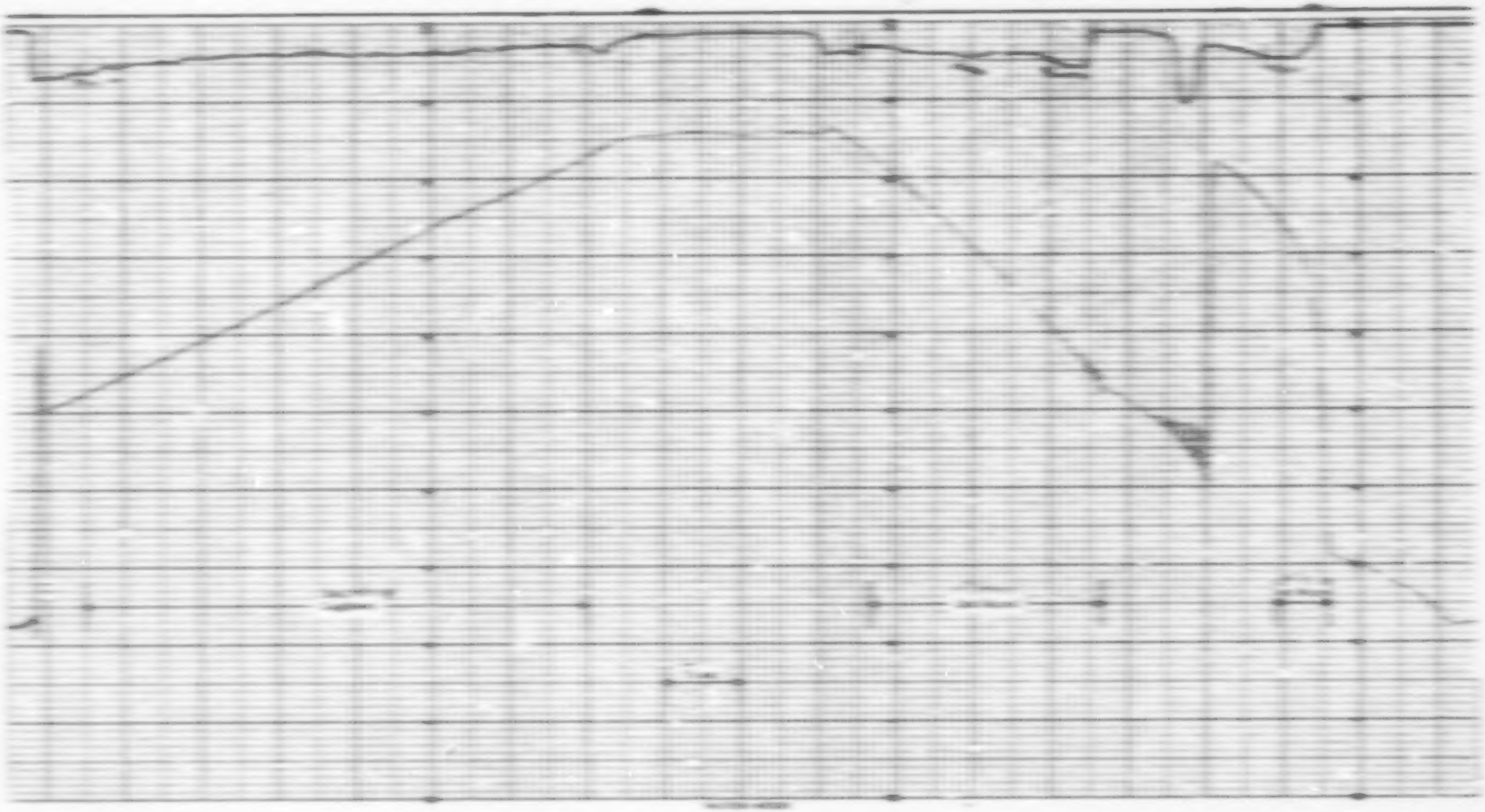


Chart Calibration—
100% Chart = 2800 RPM
0% Chart = 100% Smoke Opacity

Chart Reading—
Start/End 1st Accel:
31% to 75%

Start/End 2nd Accel:
52.5% to 63%
Start/End Lugdown:
63% to 52.5%

FIGURE 35. REPRESENTATIVE ACCEL—LUGDOWN SMOKE TRACE—BUS 707
FIRST INTERIM INSPECTION—LSN INJECTORS

TABLE 12. OVERALL SUMMARY OF SMOKE AND POWER MEASUREMENTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

[illegible]

steady state conditions, CO, HC, NO, aldehydes, formaldehyde, and acrolein were measured. The results, averages of the four replications in random order, are presented in Tables 13, 14, and 15 for Busses 702, 704, and 707, respectively. Though the LSN injectors make dramatic cuts in hydrocarbons, the catalytic muffler has substantially less effect, if any. This same conclusion is clear from the carbon monoxide measurements. The amount of reduction seems less than for HC but this is because there is very little CO in diesel exhaust to start with. The third major emission of interest from internal combustion engines, nitric oxide, was slightly increased by the application of the EIP kit. The initial increase of about 15 percent overall may be attributed directly to the action of the improved injectors in making combustion more efficient. On several instances, slight increases in NO were found with the catalytic muffler, but on the whole, the catalyst had no real effect one way or the other. More on HC, CO, and NO will be included later.

The effect of mileage on HC, CO, and partial oxygenates was essentially constant overall for the three buses. Fairly consistent reductions may be noted from the Table 13-15 data for each inspection indicating little adverse effect of engine operation and injector use on these gaseous emissions. An interesting effect was found regarding NO_x in that as mileage was accumulated, the NO_x with the LSN injectors became less than with the crown valve equipped engine. Instead of being 10 to 15 percent higher, as at the initial and first interim inspection, the NO with the LSN units gradually became 10 or so percent lower than the S units.

Engine deterioration, loss of compression through ring-liner wear and later fuel injection timing are considered the principal reasons. Timing is thought to be a major cause of the lower NO production since later, retarded timing will result in lower NO formation. This effect may be noticed by reviewing the NO net change data for Busses 704 and 707, Tables 13 and 14. The restoration of Bus 702 injector timing to 1.470 on February 10, 1972, interrupted the trend of slightly lower NO with operation. The in-test adjustment of the LSN injectors at 18 months also interrupted the trends on Busses 704 and 707.

Formaldehyde, aliphatic aldehydes, and acrolein, three partially oxygenated materials which among other items have been related to odor, are also listed on Tables 13, 14, and 15. Fairly consistent reductions in all three components were found at all inspections. The U_a statistic indicated most data points to be statistically significant reductions. There were a few exceptions mostly with Bus 702. Overall, the results are satisfactory in light of the measurement methods used. Comparing the LSN to the LSN with catalytic muffler results, it is obvious that the catalyst was ineffective in further reducing oxygenates. More detailed results of these tests may be found in the tables included in Appendix C to this report.

TABLE 13. OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

(Bus 702)

TABLE 13. (Cont.) OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 702)

TABLE 13. (Cont.) OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 702)

TABLE 14. OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS,
TWO-YEAR FLEET TEST OF GM-EIP KIT
(Bus 704)

[illegible]

TABLE 14. (Cont.) OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

(Bus 704)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
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				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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				[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]			

TABLE 14. (Cont.) OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

(Bus 704)

TABLE 15. OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

(Bus 707)

[illegible]

TABLE 15. (Cont.) OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

(Bus 707)

Operating Condition	Test Miles	Engine Hours	Test Date	Test Configuration	HC, ppmC Modification		CO, ppm Modification		NOx, ppm Modification		CO2, % Modification		Formaldehyde, ppm Modification		Aldehyde, ppm Modification		Acrolein, ppm Modification	
					EIP	EIP + Cat.	EIP	EIP + Cat.	EIP	EIP + Cat.	EIP	EIP + Cat.	EIP	EIP + Cat.	EIP	EIP + Cat.	EIP	EIP + Cat.
	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			[illegible]	Modification	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				Net Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				% Decrease	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
			[illegible]	Modification	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
				Net Change	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
				% Decrease	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
			[illegible]	Modification	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
				Net Change	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
				% Decrease	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			[illegible]	Modification	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]				Net Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				% Decrease	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			[illegible]	Modification	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				Net Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				% Decrease	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			[illegible]	Modification	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				Net Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				% Decrease	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	Stock 3	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
			[illegible]	Modification	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
				Net Change	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
				% Decrease	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

TABLE 15. (Cont.) OVERALL SUMMARY OF GASEOUS EMISSIONS MEASURED DURING ODOR TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

(Bus 707)

2. Cyclic Data

Table 16 is a brief summary of the 13-mode cyclic test for HC, CO, and NO_2. The procedure was a special city bus modification to the EMA and California ARB 13-mode schedule (now the 1974 Federal Test Procedure) and the results are expressed in terms of grams per flywheel brake horsepower-hour (g/bhp-hr). As discussed previously, the catalytic muffler demonstrated no effectiveness in reducing these three emissions. The LSN injectors did effect a gross change in brake specific hydrocarbons on the order of 80- to 90-percent reduction, while reductions in CO were on the order of 40 to 60 percent. Bus 707 did not respond the same and showed an overall increase in CO. Nitric oxide as grams NO_2 per bhp-hour was increased at the initial inspection by 10 to 15 percent by the LSN injectors, and then decreased with mileage.

The HC and NO, expressed as NO_2, results are illustrated by the bar charts in Figures 36 through 39. Figure 36 contains initial inspection, Figure 37, first interim, Figure 38 the second interim, and Figure 39 the third and final inspection results. The HC is stacked on top of the brake specific NO_2 emissions for comparison to 1973 California and 1974 Federal standards of 16 g/bhp-hr and the 1975 California standard of 5 g/bhp-hr. Although the S-equipped, or LSN injector-equipped, 6V-71E type (low compression) bus engine appears to meet the 1973-1974 standards, it remains to be seen whether the 1975 standard is possible. Even if hydrocarbons could be further reduced, say to almost zero, the 1975 California standard will be out of reach without a severe cut of NO_2.

Figures 40 through 42 depict the brake specific NO_2, CO, and HC 13-mode results as a function of test duration and service miles for the two-year demonstration. The three buses, 702, 704, and 707, graphed on Figures 40, 41, and 42, respectively, showed fairly similar behavior for HC, the LSN injectors always about ten percent of the S equipped bus. Mileage accumulation seemed to have little effect on HC production.

CO behavior was fairly consistent for Buses 702 and 704 (Figures 40 and 41) with the LSN lower than the S. Bus 707 (Figure 42) CO was higher after 5 months of operation, continued to increase until the 16-month inspection and then was found equal to the S at the 24 month end of test point. Bus 707 CO behavior was also found to be different from the other buses as was mentioned earlier during the discussion of the steady state odor run measurements.

Not much may be said for the effect of the injectors on NO (as NO_2) emissions except the 13-mode procedure shows equivalent or slightly lower NO_2 on Bus 702 and 704 with the opposite effect with Bus 707. As mileage was accumulated, Bus 707 showed an overall increase in total NO_2, Bus 702 an overall decrease, while Bus 704 stayed about the same.

TABLE 16. OVERALL SUMMARY OF GASEOUS EMISSIONS DURING CYCLIC TEST, TWO-YEAR FLEET TEST OF GM-EIP KIT

Bus No.	Test Miles	Engine Hours	Test Date	Test Configuration	HC, gr/bhp-hr Modification LSN	HC, gr/bhp-hr Modification LSN + Cat	CO, gr/bhp-hr Modification LSN	CO, gr/bhp-hr Modification LSN + Cat	NOx, gr/bhp-hr Modification LSN	NOx, gr/bhp-hr Modification LSN + Cat
707	911	99	9/4/70 9/3, 8/28/70	Stock, 8	8.36	8.36	6.17	6.17	12.74	12.74
				Modification	1.03	0.81	6.38	4.54	14.15	15.79
				Net Change	-7.33	-7.55	+0.21	-1.63	+1.41	+3.05
704	1,073	98	9/16/70 9/16, 9/11/70	Stock, 8	9.30	9.30	8.42	8.42	11.07	11.07
				Modification	1.46	1.13	5.40	3.83	13.26	12.03
				Net Change	-7.84	-8.17	-3.02	-4.59	+2.19	+0.96
702	1,756	143	10/2/70 9/30, 9/23/70	Stock, 8	9.10	9.10	7.51	7.51	12.74	12.74
				Modification	1.94	1.64	2.92	2.96	14.52	13.14
				Net Change	-7.16	-7.46	-4.59	-4.55	+1.78	+0.40
First Interim Inspection										
707	70,650	1,971	4/3/71 4/1, 3/29/71	Stock, 8	10.71	10.71	6.46	6.46	13.19	13.19
				Modification	1.24	1.13	6.42	6.72	13.10	13.45
				Net Change	-9.47	-9.58	-0.04	+0.26	-0.09	+0.26
704	33,181	2,063	4/16/71 4/15, 4/13/71	Stock, 8	11.51	11.51	6.98	6.98	10.13	10.13
				Modification	1.49	1.60	4.59	5.12	12.13	12.13
				Net Change	-10.02	-9.91	-2.39	-1.86	+2.00	+2.00
702	33,963	1,721	4/30/71 4/29, 4/26/71	Stock, 8	14.77	14.77	5.66	5.66	10.49	10.49
				Modification	1.17	1.31	3.44	4.07	10.62	10.98
				Net Change	-13.60	-13.46	-2.22	-1.59	+0.13	+0.49
Second Interim Inspection										
707	32,114	3,305	7/16/71 7/14, 7/13/71	Stock, 8	10.07	10.07	7.11	7.11	10.70	10.70
				Modification	1.33	1.09	8.02	8.58	10.85	11.58
				Net Change	-8.74	-8.98	+0.91	+1.47	+0.15	+0.88
704	42,774	3,367	7/30/71 7/28, 7/27/71	Stock, 8	13.43	13.43	10.89	10.89	10.81	10.81
				Modification	1.54	1.16	6.01	6.08	10.52	12.28
				Net Change	-11.89	-12.27	-4.88	-4.81	-0.29	+1.47
702	45,706	3,717	8/20/71 8/19, 8/17/71	Stock, 8	14.30	14.30	5.41	5.41	10.62	10.62
				Modification	1.83	1.26	3.57	3.65	11.70	11.96
				Net Change	-12.47	-13.04	-1.84	-1.76	+1.08	+1.34
Third Interim Inspection										
707	77,841	6,660	2/17/72 2/16/72	Stock, 8	8.62		6.41		14.12	
				Modification	0.94		10.07		11.96	
				Net Change	-7.68		+3.66		-2.16	
704	78,723	6,135	2/28/72 2/25/72	Stock, 8	12.96		10.71		11.28	
				Modification	1.60		5.88		11.80	
				Net Change	-11.36		-4.83		+0.52	
702	80,116	6,475	3/14/72 3/13/72	Stock, 8	8.59		8.17		10.65	
				Modification	1.41		4.77		11.51	
				Net Change	-7.18		-3.40		+0.86	
Final Inspection										
707	119,184	9,264	11/9/72 11/8/72	Stock, 8	9.00		2.33		14.76	
				Modification	1.47		2.56		12.93	
				Net Change	-7.53		+0.23		-1.83	
704	117,006	8,351	11/3/72 11/2/72	Stock, 8	9.69		6.79		11.31	
				Modification	1.51		7.64		11.20	
				Net Change	-8.18		+0.85		-0.11	
702	109,846	9,675	11/16/72 11/15/72	Stock, 8	7.35		4.07		13.50	
				Modification	0.89		2.98		12.67	
				Net Change	-6.46		-1.09		-0.83	

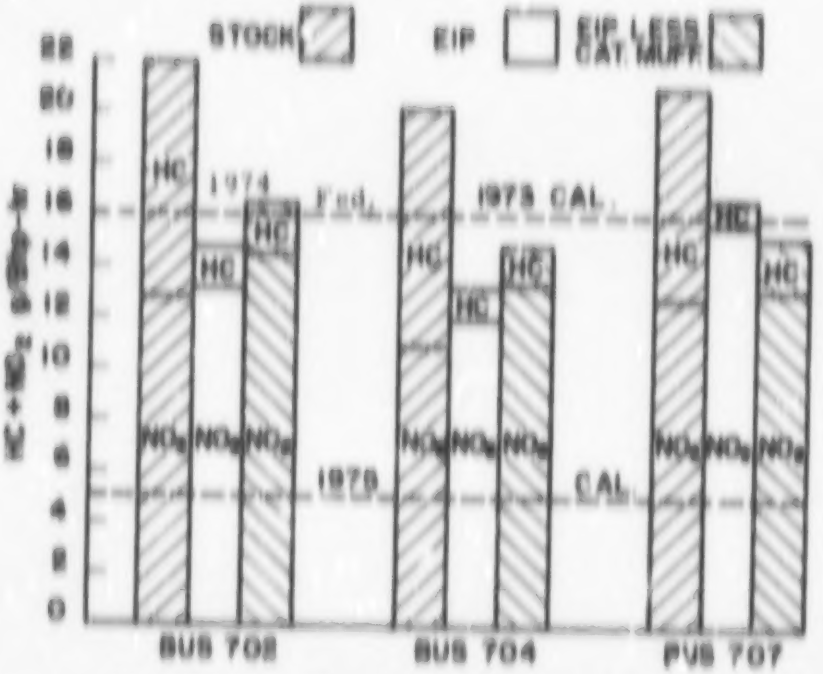


FIGURE 16. EIP VS STOCK HC + NO2--
13 MODE--INITIAL

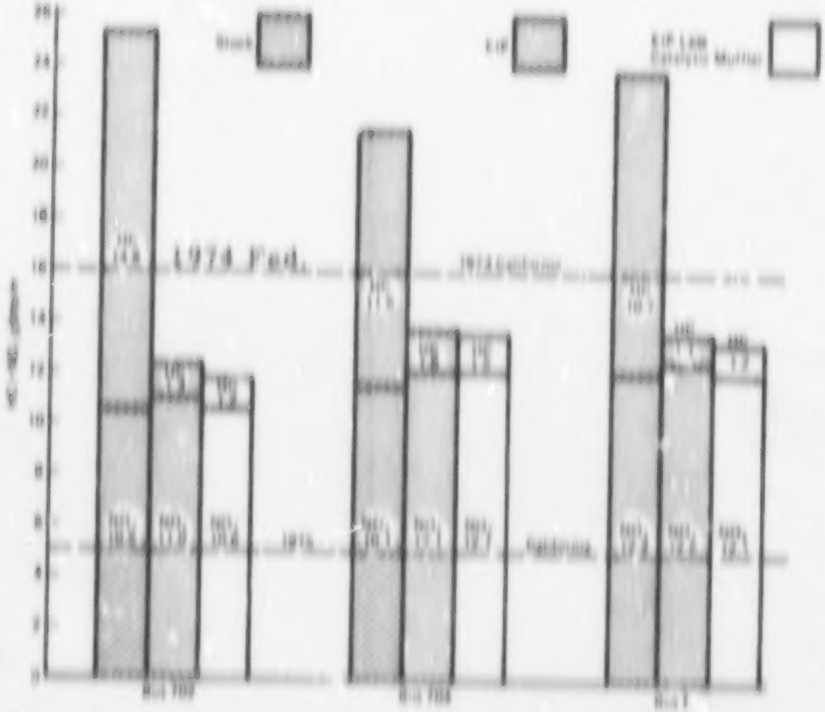


FIGURE 17. EIP VS STOCK HC + NO2--13 MODE--
FIRST INTERIM INSPECTION

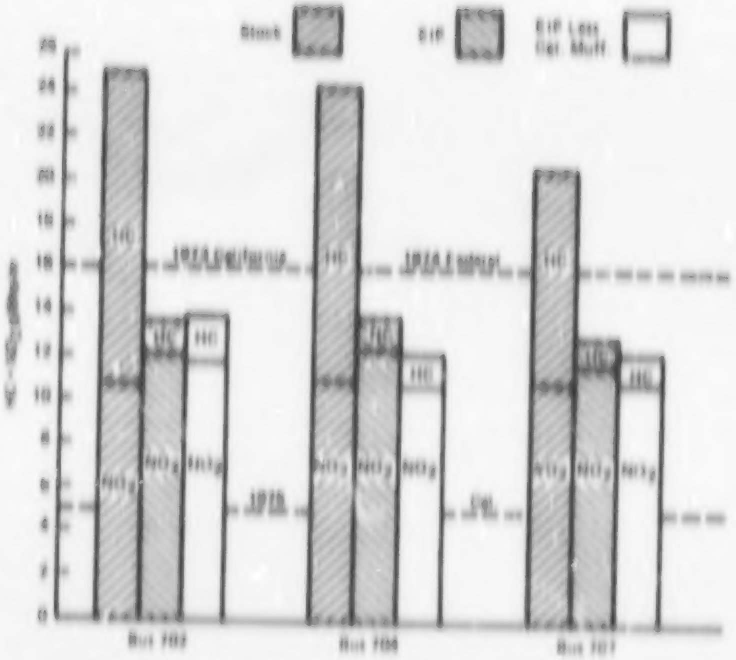


FIGURE 38. EIP VS STOCK HC + NO_x--13 MODE--
SECOND INTERIM INSPECTION

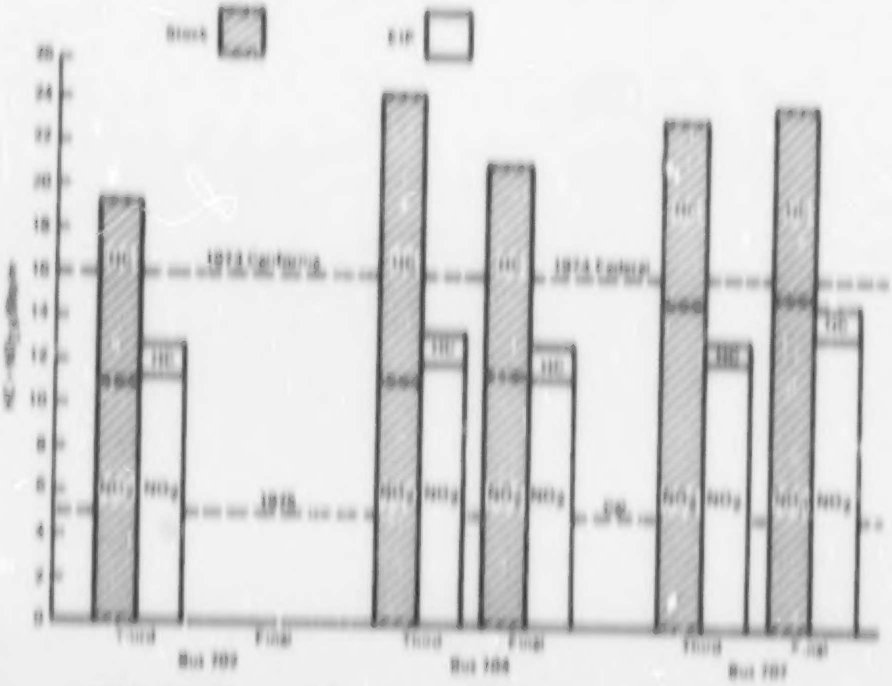


FIGURE 39. EIP VS STOCK HC + NO_x--13 MODE--
THIRD INTERIM AND FINAL INSPECTIONS

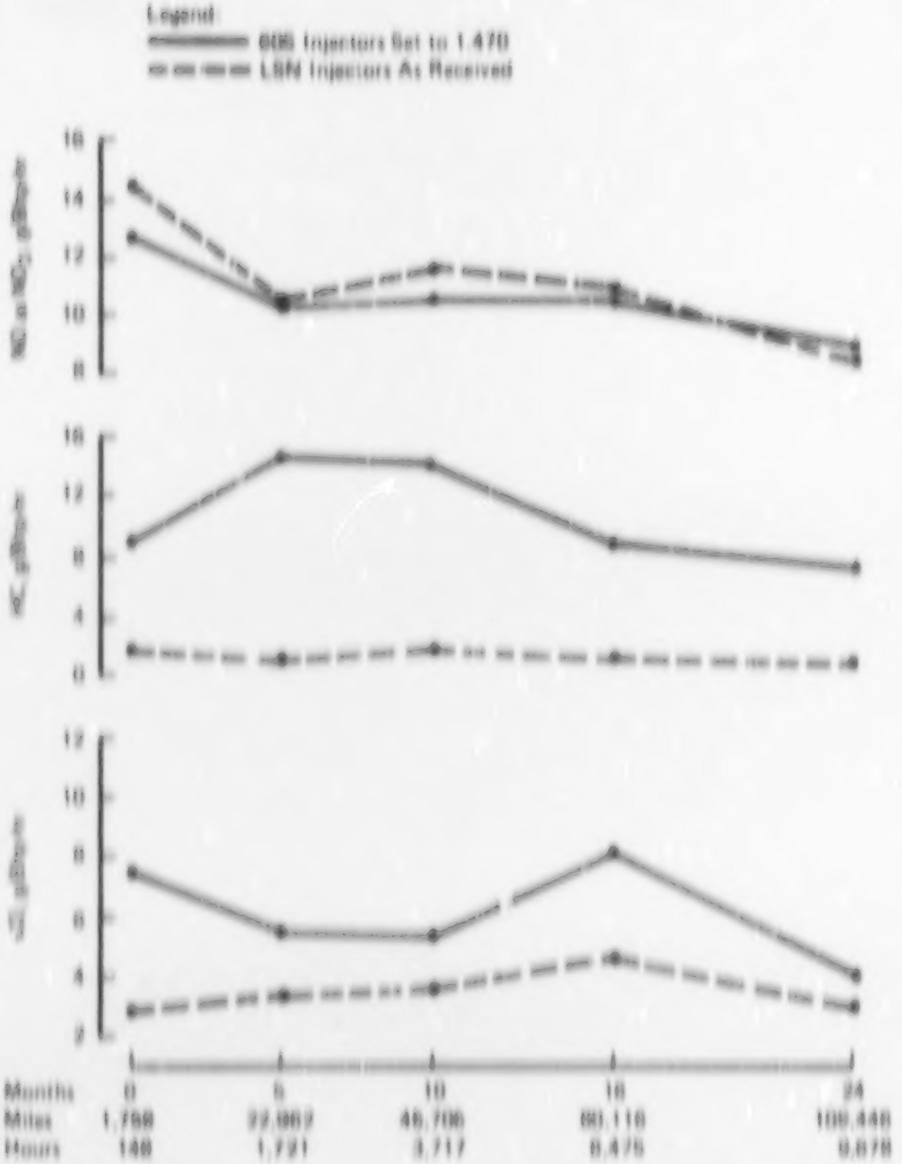


FIGURE 40. GASEOUS EMISSIONS RATES DURING TWO-YEAR TEST
(Bus 702)

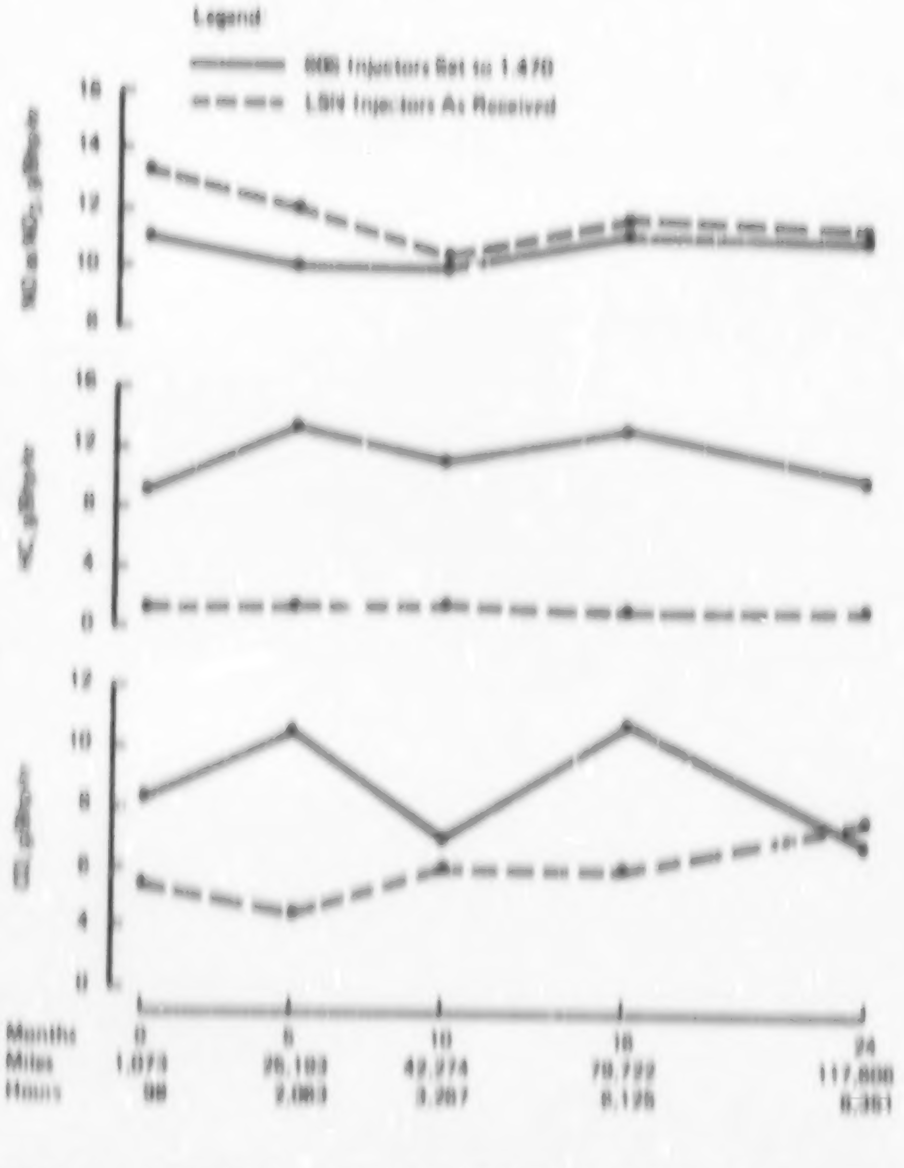


FIGURE 41. GASEOUS EMISSIONS RATES DURING TWO-YEAR TEST
(Bus 704)

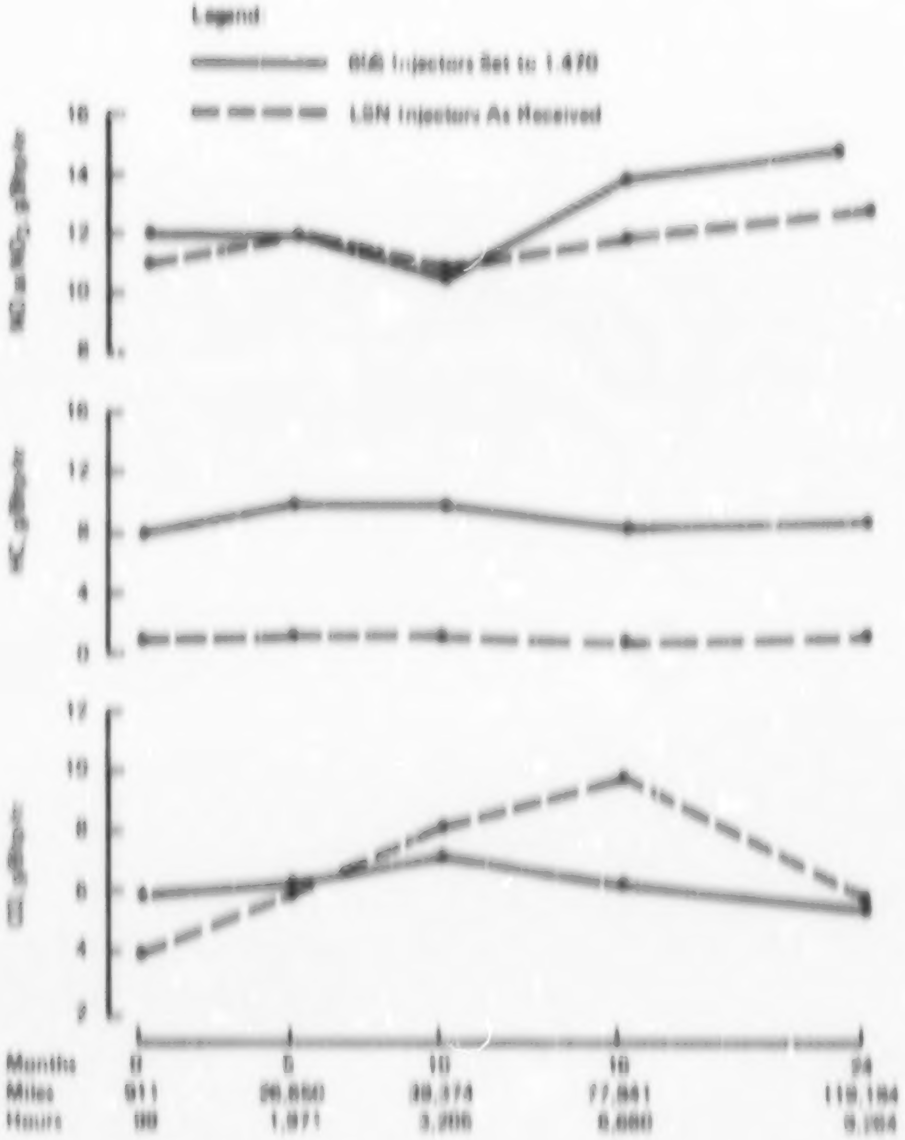


FIGURE 42. GASEOUS EMISSIONS RATES DURING TWO-YEAR TEST
(Bus 707)

Not all the reasons for this behavior are known, nor are the reasons for the peculiar excursions by certain of the buses at some test intervals with some emissions. Some of it was possibly due to the test reproducibility and the engine preparation. However, most of the reason must be attributed to the engine itself. Please recall that an in-test change was made to the injectors to return them to the 1,470 recommended setting. This could have explained the increase in NO$_x$ between the 16th and 24th month since the adjustment was made during the 18th month. This does not explain the decrease in Bus 702 during this interval. Bus 702, however, had been given injector adjustments previously.

The steady-state odor run results are possibly more instructive with regard to mileage, etc., since concentration values do not include changes in horsepower output and air flow rate, two items that can have equal impact on the brake specific emission rate. Overall, the 13-mode results do not indicate a consistent or significant increase of NO$_x$, HC, or CO with service months, vehicle miles, or engine hours as might have been anticipated. This is probably the most significant conclusion from the gaseous emissions aspect of the two-year demonstration.

Complete mode-by-mode gaseous emissions results for the 13-mode schedule are contained in Appendix C of this report. As an example of how these data could be used, mode-wise emission rates, on a grams per hour basis, have been computed for the initial and first interim inspections and are listed in Tables 17, 18, and 19 for HC, CO, and NO, respectively. These data are helpful in determining which mode or modes are more responsible for emission than others and could be graphed versus power level for both operating speeds. Another method of analysis would be to compute the emissions in terms of grams per pound of fuel consumed. This form may be helpful in determining national impact since fuel consumption in city buses is published. The only difficult part would be to determine the proper bus-use factor for weighting of the various modes. This analysis was beyond the intent of this project.

D. General Operation

Contained in this subsection are the other measurements made during and as a part of this field demonstration.

1. Pressures and Temperatures

Table 20 is a summary of the inlet and outlet temperatures, pressures, and the pressure drop and temperature change across the catalytic muffler and stock unit for comparison. The pressure drops were substantially higher with the catalytic muffler than the stock muffler under all conditions for all buses at all inspections. The pressure drop was essentially the same at all three inspections indicating the catalyst bed was not clogging.

TABLE 17. SUMMARY OF MODE BY MODE HYDROCARBON EMISSIONS, g/hr DURING CYCLIC TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

Mode No.	Engine Speed, rpm	Load, %	Initial Inspection Test Configuration			First Interim Inspection Test Configuration		
			S. Stock	LSN, Stock	LSN, Cat	S. Stock	LSN, Stock	LSN, Cat
					Bus 707			
1	550	0	123.9	27.5	20.7	156.0	37.5	36.4
2	1000	0	264.8	46.2	34.2	136.7	51.7	47.3
3	1000	25	427.7	47.0	37.5	549.8	47.8	52.7
4	1000	50	408.9	45.6	36.2	459.4	49.9	56.4
5	1000	75	393.9	50.6	66.6	499.3	61.9	65.3
6	1000	100	437.8	59.1	41.8	512.0	71.3	74.6
7	550	0	171.6	26.5	17.1	167.5	35.3	28.8
8	1600	100	616.4	81.9	39.7	770.2	100.2	86.0
9	1600	75	586.7	68.4	38.8	780.3	88.7	76.7
10	1600	50	549.3	62.5	46.9	778.5	80.0	67.8
11	1600	25	675.5	64.9	78.0	873.3	73.9	65.2
12	1600	0	697.7	65.1	70.9	961.0	71.2	62.1
13	550	0	118.1	26.5	20.6	169.8	37.5	33.3
					Bus 704			
1	550	0	143.4	17.6	29.5	160.5	41.6	34.3
2	1000	0	234.2	63.0	49.9	382.3	56.0	56.4
3	1000	25	412.4	50.5	51.5	534.2	54.4	68.0
4	1000	50	355.2	51.0	53.2	670.9	56.1	75.1
5	1000	75	442.9	59.1	53.2	567.2	68.1	91.3
6	1000	100	445.0	78.6	56.3	574.4	83.3	91.8
7	550	0	137.9	32.3	22.6	148.7	36.2	32.3
8	1600	100	613.9	96.0	78.6	803.5	122.5	130.3
9	1600	75	642.3	87.3	67.8	878.9	103.9	109.6
10	1600	50	633.2	94.6	73.2	879.4	94.0	95.9
11	1600	25	711.4	84.3	78.0	985.5	85.1	84.2
12	1600	0	675.5	84.6	81.3	970.5	82.2	84.3
13	550	0	134.2	32.4	28.5	146.5	34.4	31.3
					Bus 702			
1	550	0	118.4	48.1	36.5	167.3	18.2	25.6
2	1000	0	295.3	75.4	67.7	377.8	44.0	40.3
3	1000	25	493.7	67.1	67.2	643.6	39.0	45.8
4	1000	50	508.4	67.7	67.6	701.8	47.6	51.4
5	1000	75	450.1	775	74.1	659.6	55.9	55.5
6	1000	100	429.5	95.5	76.4	607.9	58.7	65.7
7	550	0	106.9	46.1	34.5	161.9	28.8	26.6
8	1600	100	639.0	130.2	105.6	891.7	92.4	91.4
9	1600	75	701.9	116.6	89.3	1021.2	74.5	87.6
10	1600	50	702.1	113.2	91.5	1027.4	65.8	87.9
11	1600	25	775.6	118.3	99.1	1187.0	62.6	88.1
12	1600	0	774.2	116.0	102.0	1261.5	62.8	88.1
13	550	0	106.5	49.0	37.3	152.5	37.7	37.7

TABLE 16. SUMMARY OF MODE BY MODE CARBON MONOXIDE EMISSIONS, g/hr DURING CYCLIC TESTS, TWO-YEAR FLEET TEST OF GM-EIP KIT

Mode No.	Engine Speed, rpm	Load, %	Initial Inspection Test Configuration			First Interim Inspection Test Configuration		
			S, Stack	LSN, Stack	LSN, Cat	S, Stack	LSN, Stack	LSN, Cat
Bus 707								
1	550	0	57.2	52.7	36.1	75.0	41.8	50.4
2	1000	0	90.6	77.0	64.0	110.1	65.7	64.6
3	1000	25	77.3	61.4	36.4	96.9	37.6	41.7
4	1000	50	77.7	45.1	38.6	100.8	37.9	48.1
5	1000	75	117.3	71.7	109.5	179.9	198.7	123.4
6	1000	100	2025.5	2747.9	1846.2	2069.7	3602.5	2721.6
7	550	0	48.5	48.5	28.2	67.8	36.8	47.9
8	1600	100	1003.1	726.9	526.9	1018.4	857.8	955.0
9	1600	75	128.7	75.4	64.5	139.5	57.4	97.5
10	1600	50	107.6	53.3	42.4	104.0	25.7	51.4
11	1600	25	128.6	74.6	43.2	120.2	28.6	39.6
12	1600	0	128.9	64.0	71.5	126.0	40.0	45.3
13	550	0	48.8	44.4	[illegible]	65.3	30.2	47.8
Bus 704								
1	550	0	71.8	74.1	61.2	87.6	61.0	69.4
2	1000	0	164.7	145.2	103.4	171.1	90.5	102.4
3	1000	25	118.3	71.7	61.9	106.6	44.7	68.1
4	1000	50	119.1	53.2	51.6	82.3	37.7	61.5
5	1000	75	188.9	92.6	64.9	192.1	138.4	165.2
6	1000	100	2330.7	2029.1	1212.3	2294.2	1829.3	1877.0
7	750	0	65.5	61.1	52.9	67.5	47.7	58.4
8	1600	100	1475.4	434.2	156.5	1185.4	446.3	485.2
9	1600	75	142.3	[illegible]	85.9	102.3	19.8	95.9
10	1600	50	142.0	64.8	54.1	74.4	17.2	62.0
11	1600	25	163.0	64.6	85.6	125.8	34.4	73.4
12	1600	0	174.8	86.7	86.2	125.8	34.4	72.8
13	550	0	51.0	52.8	57.0	61.2	45.3	47.3
Bus 702								
1	550	0	80.9	74.0	69.8	62.5	47.5	49.6
2	1000	0	179.5	117.9	124.3	119.6	88.7	88.8
3	1000	25	139.5	71.1	64.6	92.6	44.3	51.0
4	1000	50	117.2	51.8	51.7	82.7	27.1	41.1
5	1000	75	434.0	38.6	31.9	130.3	97.3	121.9
6	1000	100	3025.2	688.7	720.9	1939.5	1181.6	1307.6
7	550	0	72.5	43.1	48.7	58.0	38.8	45.0
8	1600	100	724.6	138.2	209.4	429.1	330.9	313.4
9	1600	75	168.2	76.0	75.3	110.0	28.8	50.8
10	1600	50	160.9	64.8	68.2	91.9	17.3	30.4
11	1600	25	230.5	86.4	85.7	125.8	28.6	16.7
12	1600	0	208.8	86.6	96.0	120.0	22.7	19.5
13	550	0	72.0	56.8	52.9	45.0	32.1	36.1

TABLE 19. SUMMARY OF MODE BY MODE NITRIC OXIDE EMISSIONS, g/hr DURING CYCLIC TESTS, TWO-YEAR FLEET TEST OF GM EIP KIT

Mode No.	Engine Speed, rpm	Load, %	Initial Inspection Test Configuration S. Stock	Initial Inspection Test Configuration LSN. Stock	Initial Inspection Test Configuration LSN. Cat	First Interim Inspection Test Configuration S. Stock	First Interim Inspection Test Configuration LSN. Stock	First Interim Inspection Test Configuration LSN. Cat
				Bus 707				
1	550	0	62.8	88.0	96.7	67.9	68.2	88.7
2	1000	0	90.1	111.3	145.4	114.6	115.5	122.7
3	1000	25	261.1	260.0	293.8	236.1	222.8	228.9
4	1000	50	377.5	338.7	441.0	355.5	363.9	373.2
5	1000	75	583.0	653.9	752.9	522.7	531.5	541.5
6	1000	100	666.1	674.6	708.7	570.9	509.1	533.9
7	550	0	78.2	105.8	120.1	79.2	82.9	96.9
8	1600	100	1164.8	1245.1	1312.2	1063.7	983.5	1029.3
9	1600	75	850.1	1023.6	1094.0	850.2	848.4	867.6
10	1600	50	566.1	606.4	718.6	592.3	560.0	567.5
11	1600	25	305.9	330.9	421.9	349.3	349.4	379.6
12	1600	0	151.4	177.1	490.3	161.5	128.5	165.1
13	550	0	76.0	94.1	103.6	70.5	87.1	96.9
				Bus 704				
1	550	0	64.9	90.1	73.9	47.8	62.8	52.4
2	1000	0	86.1	111.2	106.2	76.1	105.0	107.4
3	1000	25	177.7	244.8	175.8	186.1	218.4	213.1
4	1000	50	314.9	386.7	347.8	301.0	351.8	334.8
5	1000	75	445.3	591.1	539.0	495.1	598.1	563.0
6	1000	100	553.5	620.5	656.9	578.6	560.7	524.1
7	550	0	73.3	89.8	83.0	57.4	69.5	73.8
8	1600	100	996.5	1008.2	932.1	927.3	934.6	910.4
9	1600	75	593.1	831.0	726.2	692.3	808.7	754.7
10	1600	50	455.3	571.8	477.1	485.9	527.3	517.2
11	1600	25	321.7	341.5	293.6	288.8	321.5	333.2
12	1600	0	288.0	349.4	347.4	281.7	298.8	333.1
13	550	0	71.3	89.6	80.4	59.4	59.1	79.6
				Bus 703				
1	550	0	67.4	62.9	62.9	49.3	49.4	49.4
2	1000	0	96.8	100.2	91.2	94.5	86.7	92.0
3	1000	[illegible]	220.7	242.7	227.0	172.8	191.6	182.0
4	1000	50	264.7	317.0	313.2	268.5	287.4	265.2
5	1000	75	562.4	531.1	499.1	433.7	449.1	441.8
6	1000	100	607.0	687.6	562.4	496.1	518.2	486.6
7	550	0	80.5	91.7	80.7	55.4	58.7	61.5
8	1600	100	1030.9	1033.7	975.2	857.3	747.6	740.6
9	1600	75	859.2	873.6	735.9	650.7	556.1	573.4
10	1600	50	538.1	588.5	512.6	443.6	435.7	607.6
11	1600	25	310.0	373.5	325.3	269.3	273.9	279.2
12	1600	0	397.2	361.6	358.7	384.9	395.4	384.4
13	550	0	78.0	96.3	83.1	56.4	58.6	51.4

TABLE 20. CATALYTIC MUFFLER INLET/OUTLET TEMPERATURES AND PRESSURES, TWO-YEAR FLEET TEST OF GM EIP KIT

Operating Condition	Bus No.	Test Miles	Engine Hours	Test Date		Pressures, in. H_2O						Temperatures, F					
						Inlet		Outlet		Drop		Inlet		Outlet		Difference	
				Stock	Cat	Stock	Cat	Stock	Cat	Stock	Cat	Stock	Cat	Stock	Cat	Stock	Cat
24 mph 900 rpm 1/2 load	707	911	99	9/1	8/31	8	11	5	7	3	4	485	510	345	445	140	65
	708	1,073	98	9/13	9/14	8	11	6	4	2	7	460	505	310	320	150	140
	702	1,758	142	10/1	9/28	8	10.5	5	6.5	3	4	470	480	350	385	120	195
	707	26,650	1,871	3/31/71	3/30/71	7	11	6	6	1	5	430	345	300	280	130	65
	708	25,193	2,063	4/16/71	4/13/71	10	15	8	7	2	8	510	460	310	210	200	250
	702	22,963	1,731	4/28/71	4/27/71	9	13	7	6	2	6.0	475	480	325	275	150	205
	707	39,374	3,205	7/16/71	7/13/71	10	12	8.5	7	1.5	5	563	540	486	411	77	129
	708	42,274	3,267	7/30/71	8/6/71	11	16.5	8	9.0	3	7.5	429	496	285	400	144	96
	702	45,706	3,717	8/20/71	8/17/71	8.5	10	7	8	1.5	2	453	485	435	400	18	85
32 mph 1200 rpm 1/2 load	707	911	99	8/31	9/1	13	17	9	10	4	7	505	550	355	410	150	140
	708	1,073	98	9/13	9/14	14	22	9	9	5	12	490	520	335	305	155	215
	702	1,758	142	10/1	9/28	14	20	9	8	5	12	535	480	375	315	160	165
	707	26,650	1,871	3/31/71	3/30/71	15	21	12	12	3	9	575	560	330	310	245	250
	708	25,193	2,063	4/16/71	4/13/71	18	25	14	11	4	14	525	500	345	300	180	200
	702	22,963	1,731	4/28/71	4/27/71	15	23	12	12.0	3	11	490	505	355	385	135	120
	707	39,374	3,205	7/16/71	7/13/71	22	24	18	14	4	10	600	593	534	488	66	105
	708	42,274	3,267	7/30/71	8/6/71	22	29	14.5	18.5	7.5	10.5	548	523	313	429	235	94
	702	45,706	3,717	8/20/71	8/17/71	16	17	12.5	13	3.5	4	483	523	464	410	19	113
40 mph 1500 rpm 1/2 load	707	911	99	9/1	8/31	22	30	15	18	7	12	545	620	365	525	180	95
	708	1,073	98	9/13	9/14	21	36	15	15	7	21	560	560	370	380	190	180
	702	1,758	142	10/1	9/28	24	37	14	13	8	19	575	525	410	370	165	155
	707	26,650	1,871	3/31/71	3/30/71	24	30	20	17	4	13	685	650	370	505	315	145
	708	25,193	2,063	4/14/71	4/13/71	27	39	21	19	6	20	560	510	390	310	170	200
	702	22,963	1,731	4/28/71	4/27/71	21	34	17	18	4	16	540	545	380	360	160	185
	707	39,374	3,205	7/16/71	7/13/71	33	38	26.5	23	6.5	15	610	590	564	524	46	66
	708	42,274	3,267	7/30/71	8/6/71	34	47	22	26	12	21	568	569	360	480	208	89
	702	45,706	3,717	8/20/71	8/17/71	24.5	23	20	20	4.5	3	534	556	510	428	24	128
Idle	707	911	99	9/1	8/31	4	4	2	2	2	2	260	260	300	350	40	+90
	708	1,073	98	9/13	9/14	3	4	2	2	1	2	270	260	305	330	35	+70
	702	1,758	142	10/1	9/28	3	3.5	2	1.5	1	2	270	260	295	305	25	+45
	707	26,650	1,871	3/31/71	3/30/71	2	4	2	2	0	2	305	260	305	270	0	+10
	708	25,153	2,063	4/14/71	4/12/71	2	4	2	2	0	2	320	280	310	310	10	+30
	702	22,963	1,731	4/28/71	4/27/71	3.0	3.0	1.0	1.5	1.0	1.2	295	290	290	370	5	+120
	707	39,374	3,205	7/16/71	7/13/71	2	4	1.5	2.5	0.5	1.5	300	303	410	398	+110	+95
	708	42,274	3,267	7/30/71	8/6/71	4	4	3	3	1	1	285	256	175	400	110	+144
	702	45,706	3,717	8/20/71	8/17/71	3	3	2.5	2.5	0.5	0.5	271	276	384	364	+113	+88

packing, sintering, or sticking in the muffler and that the exhaust gases were not more restricted after about 35,000 or 40,000 miles than when the units had been in operation for 1000 miles. The restriction imposed by the catalytic muffler is still less than the maximum allowed by the manufacturer.

The temperature change, the inlet gas minus the outlet gas temperature, gave no conclusive indication of catalyst activity. Sometimes the change was slightly more or less than the stock unit and no clear trend was evident from an analysis of conditions, buses, or inspection periods. One interesting point, found during tests of this type muffler several years ago, was the increase in temperature of the catalytic muffler exit gases during idle. This is not from the activity of the catalyst but is attributed to the heat stored in the 40 lb of charge within the muffler during the previous running condition. When the cooler idle exhaust enters the muffler, heat is transferred to the gas and the muffler cools down.

Table 21 lists pertinent air box and exhaust restrictions taken at all inspections at 1200, 1800, and 2100 rpm with the transmission in neutral. The inlet air restrictions are well below the manufacturers' allowable and stayed nearly the same during the test for all units. Air box pressures likewise were stable and were only slightly higher for the EIP (catalytic muffler) than the stock configuration. Exhaust back pressure was twice that of the stock muffler when the catalytic muffler was employed. The air box and exhaust back pressures were not considered excessive.

4. Mileage and Maintenance

Table 22 summarizes operating data for the three buses during the two years of operation on a bimonthly basis as far as miles and hours of operation, fuel and oil consumption, and number of days operated. Miles operated per test period dropped off after period 9 at SwRI request. This was necessary to keep the fleet from accumulating an excessive amount over the planned 20,000 miles for the first interim inspection. Delays in authorization of the contract modification resulted in a mileage stretch-out for about two months in which buses were operated on a minimum mileage per day basis and were not operated every day. The high rate of accumulation was then resumed until the last six months of the project where there was some question whether Bus 704 would be able to complete the two year test without major maintenance.

Maintenance performed to the EIP kit involved replacement of the vertical exhaust pipe fiberglass shroud on Bus 702 on September 9, 1976, which was ripped off by the automatic washing machine and damaged beyond repair. Repair and repainting of the exhaust shroud on Bus 702

TABLE 21. AIR BOX, INLET, AND EXHAUST PRESSURES UNDER NO-LOAD CONDITIONS, TWO-YEAR FLEET TEST OF GM-EIP KIT

Bus No.	Test Miles	Engine Hours	Test Date	Test Configuration	Pressures at rpm								
					Inlet, in. H2O Vac			Air Box, in. Hg			Exhaust, in. Hg		
					1300	1800	2100	1300	1800	2100	1300	1800	2100
707	911	98	8/27/70 9/8/70	EIP Stock	1.7 1.7	3.8 3.7	5.0 4.6	6.6 5.9	11.4 9.6	14.5 14.0	1.1 0.5	2.4 0.8	3.6 1.2
706	1,073	98	9/10/70 9/18/70	EIP Stock	1.5 1.5	3.6 3.5	4.9 4.6	8.0 7.7	10.4 8.4	15.0 11.9	1.0 0.4	2.6 1.1	3.4 1.9
702	1,788	162	9/24/70 10/2/70	EIP Stock	1.6 1.5	3.2 3.2	4.2 4.4	5.6 5.7	8.7 9.6	12.3 13.6	0.85 0.4	3.2 1.2	3.2 1.4
First Interim Inspection													
707	26,680	1,971	3/29/71 3/31/71	EIP Stock	3.1 2.6	6.4 5.5	8.1 7.1	3.7 3.18	9.1 7.18	12.8 10.2	0.9 0.1	2.3 0.6	3.1 1.2
706	25,193	2,067	4/12/71 4/16/71	EIP Stock	3.6 3.2	8.6 7.0	12.0 9.2	3.3 3.2	8.1 8.6	12.3 12.2	1.0 0.6	2.5 1.2	3.7 1.6
702	23,862	1,731	4/26/71 4/28/71	EIP Stock	2.0 2.1	4.4 4.7	5.72 6.1	1.8 3.5	8.8 8.62	12.7 13.6	1.0 0.4	2.2 0.9	3.6 1.4
Second Interim Inspection													
707	39,774	3,208	7/12/71 7/14/71	EIP Stock	2.5 2.6	3.9 3.3	7.6 7.6	3.6 3.3	8.9 8.2	12.3 12.4	0.9 0.4	2.0 1.2	2.9 1.8
706	43,274	3,367	7/26/71 7/28/71	EIP Stock	2.8 2.8	6.2 5.8	8.3 7.3	2.9 2.4	6.0 3.0	9.0 8.0	1.1 0.7	2.6 1.7	3.8 3.3
702	45,706	3,717	8/18/71 8/20/71	EIP Stock	2.2 2.4	4.1 4.7	5.6 5.9	3.3 3.0	8.1 8.9	12.5 13.0	1.0 0.5	2.3 1.1	1.7 1.1
Third Interim Inspection													
707	77,841	5,660	3/16/72	Stock¹	3.6	6.2	8.0	3.8	8.6	12.4	0.7	1.8	3.1
706	79,722	6,125	3/21/72	Stock¹	3.8	10.0	11.8	3.1	8.2	13.2	0.5	1.1	1.8
702	87,116	6,475	3/9/72	Stock¹	2.4	5.0	6.4	2.8	8.4	13.0	0.9	2.0	2.8
Final Inspection													
707	119,184	9,264	11/10/72	Stock¹	4.0	8.6	12.0	2.2	7.1	9.8	0.4	1.4	1.9
706	117,406	8,731	10/31/72	Stock¹	2.5	5.5	9.1	2.8	5.5	9.3	0.3	1.2	1.8
702	109,886	9,678	11/15/72	Stock¹	3.4	6.8	8.4	3.5	8.0	11.8	0.3	1.0	1.4

¹Stock means stock muffler with LBN injector.

TABLE 22. GENERAL OPERATING DATA-- TWO YEAR FLEET TEST OF GM-EIP KIT

[illegible]

on March 30, 1971 (1963 hr) and replacement of the rubber channel around the rear glass adjacent to the vertical stack were also necessary. The rubber was brittle due to apparent heat damage from the vertical exhaust pipe. Approximately one hour of labor was expended in replacing the exhaust shroud, and the part was furnished at no charge by the manufacturer. Repair and repainting of Bus 702 on March 30, 1971, involved 14 hr of labor. During period 31, a faulty injector was replaced, as described earlier, in Bus 702 due to a smoke complaint.

Adjustment of Bus 704 injectors and governor rack controls as well as replacement of the air filter was made during period number 36. During period 24, the effect of fuel on emissions was investigated with this bus. During period 40, Bus 704 had excessive smoke not attributed to the EIP kit but to stuck fire rings on the pistons. This is not an uncommon problem with the engines in this type of service and is quite dependent on lube oil quality among other factors. The piston tops and rings were soaked over the weekend with a commercial engine treatment solvent which was successful in restoring compression. In addition to this maintenance, the scavenging blower was replaced. A smoke check was then made during period 41.

Bus 707 as well as Buses 704 and 702 received an unscheduled injector adjustment during period 41 as mentioned earlier. Other than routine, scheduled, preventative maintenance to the engine such as oil change, filter replacement, etc., no other engine maintenance was performed that would affect exhaust emissions.

V. EFFECT OF FUEL ON EMISSIONS

One goal of the two-year demonstration project of the EIP kit was to investigate whether No. 1 diesel fuel should be used exclusively in city transit coaches. A fairly involved test series was performed in one of the transit coaches, Bus 704. The experiments included both measurements and analysis of the odor, smoke, and gaseous emissions of Bus 704 using locally marketed commercial Nos. 1 and 2 fuels and a super premium No. 2 diesel fuel marketed in the Chicago area. Results of an inspection of the three diesel fuels tested were shown in Table 1 which lists distillation as well as FIA analysis and sulfur content, cetane number, and gravity.

The locally available name brand DF-1 and DF-2 fuels resulted in few statistically significant differences in odor ratings. This finding is indicated by the first two bars for each of the six operating conditions illustrated in Figure 43, with tabulated odor panel average results listed in Table 23. The predominate number of secondary footnote references in Table 23 indicates the lack of a statistically significant difference in the odors of the two fuels as measured by the Turk kit. Referring to the third bar of each group, in Figure 43, one can see in graphical form that the super premium DF-2 fuel obtained from the Chicago area gave a noticeably higher odor level than that of either locally available material. Table 24 lists the individual "D", "B", "O", "A", and "P" results, and in only two conditions, the idle-acceleration and deceleration, did this fuel fail to have a statistically significant impact on measured odor.

Tables 25 and 26 compare the gaseous emissions results obtained during the odor tests. Table 25 compares the locally available commercial DF-2 fuel with the DF-1 fuel, indicating only a few instances in which the exhaust emissions were different. Even when such differences did exist, they were not substantial. This was somewhat the case with the Chicago area premium No. 2 fuel when compared to the No. 1 material. Formaldehyde, aliphatic aldehydes, acrolein, and NO sometimes had a statistically indicated difference. Generally, NO was slightly greater with the Chicago area fuel, while formaldehyde and aliphatic aldehydes showed a mixed behavior. The differences thus found were scattered throughout the run conditions and showed no gross difference in gaseous emissions that could be directly attributed to the fuel.

Table 27 lists the overall average results for smoke during the Federal smoke test, a power curve smoke test, and a repeated EMA 13-mode gaseous emissions test. Bus 704, a fairly low-smoke output vehicle, did exhibit a noticeable and measurable increase in smoke and power when it operated on the locally available DF-2 fuel. The use of premium Chicago name brand DF-2 fuel resulted in smoke and power levels between those of the local DF-1 and DF-2 fuels. It is unlikely that a smoke additive was in the Chicago area DF-2 fuel; thus, its lower smoke and power levels were

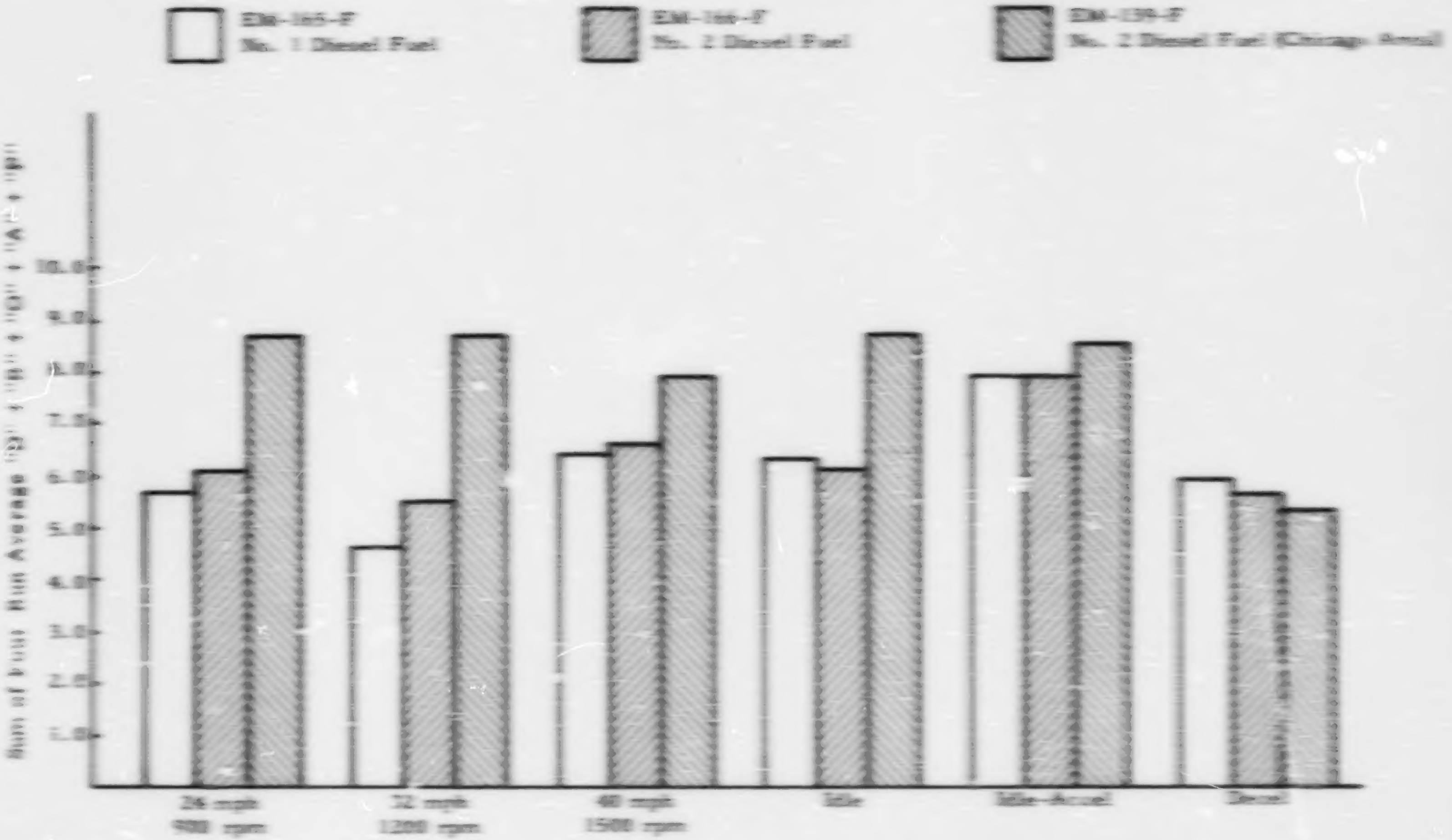


FIGURE 43. ODOR FROM BUS 704 OPERATING ON THREE DIFFERENT FUELS

TABLE 23. COMPARISON OF ODOR RATINGS (Locally Available Name Brand Diesel Fuels)

Vehicle: Bus [illegible]   Date: August 4 & 5, 1971

Run Condition	Fuel	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
25 mph 700 rpm 1/2 load*	EM-165-F (DF-1) EM-166-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34 mph 1500 rpm 1/2 load	EM-165-F (DF-1) EM-166-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph 1800 rpm 1/2 load	EM-165-F (DF-1) EM-166-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	EM-165-F (DF-1) EM-166-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle-Acceleration	EM-165-F (DF-1) EM-166-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Deceleration	EM-165-F (DF-1) EM-166-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at a fuel rate midway between maximum and no load fuel rate.
†U_s greater than 2, no statistical difference apparent.

TABLE 24. COMPARISON OF ODOR RATINGS (Locally Available DF-1 and Chicago Area DF-2 Fuels)

Vehicle: Bus [illegible]   Date: August 4 & 5, 1971

Run Condition	Fuel	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
25 mph 700 rpm 1/2 load*	EM-165-F (DF-1) EM-[illegible]-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34 mph 1500 rpm 1/2 load	EM-165-F (DF-1) EM-[illegible]-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph 1800 rpm 1/2 load	EM-165-F (DF-1) EM-[illegible]-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	EM-165-F (DF-1) EM-[illegible]-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle-Acceleration	EM-165-F (DF-1) EM-[illegible]-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Deceleration	EM-165-F (DF-1) EM-[illegible]-F (DF-2) Net Change U_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at a fuel rate midway between maximum and no load fuel rate.
†U_s greater than 2, no statistical difference apparent.

TABLE 25. COMPARISON OF GASEOUS EMISSIONS MEASUREMENTS

(Locally Available Name Brand Diesel Fuels)

Vehicle: Bus 708 Date: August 1 & 3, 1971

Run Condition	Fuel	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes*, ppm
16 mph 900 rpm 1/2 load†	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34 mph 1500 rpm 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
60 mph 1900 rpm 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*As ppm formaldehyde.
†Engine operated at a fuel rate midway between maximum and no load fuel rate.
‡t_s greater than 2, no statistical difference apparent.

TABLE 26. COMPARISON OF GASEOUS EMISSIONS MEASUREMENTS

(Locally Available DF-1 and Chicago Area DF-2 Fuels)

Vehicle: Bus 708 Date: August 4 & 5, 1971

Run Condition	Fuel	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes*, ppm
16 mph 900 rpm 1/2 load†	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34 mph 1500 rpm 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
60 mph 1900 rpm 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Pct Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	t_s Statistic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*As ppm formaldehyde.
†Engine operated at a fuel rate midway between maximum and no load fuel rate.
‡t_s greater than 2, no statistical difference apparent.

TABLE 27. EFFECT OF FUEL ON SMOKE AND CYCLIC EMISSIONS RESULTS - BUS 704

Results of Federal Smoke Tests

	PHS Smoke Opacity, %		
	DF-1	DF-2	DF-2 (Chicago)
"a" Factor	4.2	6.1	3.4
"b" Factor	3.4	5.2	3.2

Results of Power Curve-Smoke Tests

Engine Speed, rpm	DF-1		DF-2 (Local)		DF-2 (Chicago)	
	Smoke, %	Power, hp*	Smoke, %	Power, hp	Smoke, %	Power, hp
2000	3.0	92	3.5	109	2.0	96
1800	3.0	90	3.6	106	2.1	100
1600	2.9	90	3.7	103	2.2	96
1400	3.0	82	4.5	96	2.7	88
1200	4.1	78	6.1	87	3.9	84
1000	5.4	67	9.0	73	6.2	68

Results of EMA 13-Mode, 30-Min Gaseous Emissions Tests

	Brake Specific Emissions, g/bhp-hr		
	DF-1	DF-2	DF-2 (Chicago)
HC	1.84	1.44	1.44
CO	5.17	7.71	7.51
NO	7.68	6.98	7.78
NO as NO_2	11.77	10.70	11.93
HC + NO_2	13.61	12.14	13.37

*Observed at rear wheels.

probably a function of fuel properties such as specific gravity, etc.

Listed below Table 27 are the results of the 13-mode cyclic emissions test, in terms of grams per brake horsepower-hour. Though HC and NO were not grossly affected, CO was increased when the heavier No. 2 diesel fuels were burned. The combined brake specific emission rates of HC plus NO_2 showed little difference between fuels.

Tables 23 through 27 are summaries of more extensive run results listed in Appendix E of this report. Tables E-1 through E-3 list the four-run average results for the overall composite odor and each of the four qualities which make up the "D" odor. On each of these three tables, the odor panel responses are summarized for the 24 runs, six conditions in quadruplicate presented in random order to the panel. From these tables, an idea of the run-to-run repeatability and the variability of the panel averages can be ascertained. In a similar format, the exhaust emissions taken during the odor runs are listed on Tables E-4 through E-6 for the four steady state conditions. Tables E-7 through E-9 list the detailed cyclic emission results and pertinent engine power airflow and fuel flow for calculation of brake specific CO, HC, and NO emission rates.

As an example of how this type of data might be used to further analyze the effect of fuels, additional calculations were made of the cyclic results. Emission rates in terms of grams per hour and grams per pound of fuel consumed are listed in Table E-10, the values of which were computed from averages of the 13-mode cyclic results shown in Tables E-7 through E-9. The results are plotted as a function of engine load per hour for grams of HC, CO, and NO (Figures E-1 through E-3). Figures E-4 through E-6 indicate the grams of HC, CO, and NO on a per pound of fuel burned basis. Also in Appendix E, the curves are listed for both 1000- and 1600-rpm engine speed for the power output from 0 to 100%.

Though these curves are instructive in the behavior of diesel emissions as a function of speed and load, they represent only one way of considering emission rates and the potentialities of analysis when basic information within the speed and power operating range of the engine is known. Additional analyses such as these can be made from the basic information given in Tables E-7 through E-9. Last, Appendix E contains the smoke data read from the continuous trace of the Federal smoke test procedure. This is a chassis simulated test, as specified in the Federal Register, and the readings for both the "a" factor and the lugdown, or "b" factor are shown in Tables E-11 through E-16. These tables, which list the detailed smoke readings, are included for further analysis if desired.

In summary, this series of tests demonstrated the need for city bus properties to operate transit coaches on kerosene-type diesel fuel if available in their area. The heavier diesel fuel normally used in over-the-road or intercity-type truck/tractor and bus operation was found to produce an odor judged by the odor panel to be harsher, longer lasting, more penetrating, and thus more objectionable than the kerosene-type diesel fuel. This was especially true for the specific sample of a Chicago area premium DF-2 fuel. Substantial increases in measured "D" intensity as well as in certain of the odor qualities were found to be statistically significant with this fuel when compared to a DF-1 fuel. The effect of No. 2 diesel fuel is, generally, to increase power and smoke over that afforded by the lighter, less dense, No. 1 kerosene-type fuel. The two different diesel fuels of the DF-2 type employed in this study demonstrated this fact, although the increases in smoke must be termed slight. This is due probably to the very low smoke level of the unit employed in the test and the cleaner burning characteristics of the improved LSN injectors. Other emissions, such as HC, CO, and NO, were largely unaffected, with the possible exception of CO which increased moderately with the No. 2 fuels.

VI. COST-EFFECTIVENESS

This project did not include a rigorous cost-effectiveness appraisal as part of the statement of work. Some general observations can and should be made, however, to place certain of the components in perspective.

A. Noise Items

It is uncertain whether the amount of noise reduction afforded by the EIP kit is sufficient to warrant these items. Only the interior noise levels were affected and, in comparison to cutting off the air conditioner on the buses evaluated, the noise reduction seemed moderate. To make the kit more effective from an interior noise standpoint, at least on units with the type factory-installed air conditioner used by San Antonio Transit on these three units, provision for air-conditioner noise reduction seems appropriate.

The interior noise reduction, claimed by the manufacturer and confirmed by this test, appeared somewhat offset by an increase in the exterior noise level. The EIP-recommended upshift speed will likely raise the upshift point of many city buses and result in higher engine speeds and attendant sound level. The higher engine speeds may be found to be an annoyance, especially in residential houses and apartments in the morning and at night.

In this regard, the electromechanical transmission governor for setting upshift-downshift points, of the type used in the three San Antonio Transit System buses, should be replaced by an improved unit as part of the EIP kit. The field and laboratory experience gained in operation of these type units, both new and rebuilt, illustrated their inability to be dependable in holding the precise set points needed for EIP operation. The effectiveness of this type governor is judged below the standards necessary for maintenance of desired shift points. It was most difficult to set originally and drifted down during the initial 25,000 miles of test. Not all buses for which the EIP kit is intended employ this particular electromechanical governor. The EIP kit should, for those buses so equipped with old style electromechanical governors, include an improved, more reliable, and easier to adjust transmission governor. If not, some of the improvements claimed for the kit by raising upshift and downshift speeds will be reduced should, for example, the downshift point drift down by 150 to 200 rpm. Finally, the vertical stack moves the exhaust gas noise from streetside bumper level to a less noticeable streetside but vertical orientation above ear height.

B. Catalytic Muffler

As a result of this test program, little can be reported for the catalytic muffler used in the EIP kit. Generally, the effectiveness on odor, smoke, and gaseous emissions varied slightly on both sides of zero, and consistent, significant trends in reduced emissions were not demonstrated on the three units tested. One claim for the catalyst was that it would serve to reduce emissions from an engine that had not received proper maintenance or adjustment. The was not shown during the test. For example, Bus 707, with two injectors that had become substantially out of adjustment at the first interim inspection, showed essentially the same emissions when the catalytic muffler was used as when the LSN injectors were employed. It is not possible to express a ratio of cost to effectiveness when the denominator is essentially zero.

As mentioned earlier, the catalytic muffler item was discontinued after approximately 40,000 miles, the recommended life of the material. According to the manufacturer, the cost of the catalyst is $2.77 per lb (2/23/71 price) and the container is charged with 40-lb of catalyst.

C. Vertical Stack

There is no doubt that the vertical stack makes the odor less noticeable by directing it up and diluting it more before it is experienced by persons at street level. Whether the vertical stack is an acceptable control method for odor is debatable at this point since control of smoke, another nuisance emission, does not recognize dilution effects, i.e., give vertical stacks a greater dilution ratio than horizontal. The determination of the amount of dilution from a vertical stack-equipped city bus (EIP item) has never been determined under driving conditions, though a static idle condition was investigated by General Motors Research and reported on in Reference 14. If dispersing and diluting the exhaust odor is considered an acceptable control method, then the effect is probably large relative to the cost and the vertical stack enjoys an attractive cost-effectiveness ratio. The one disadvantage cited by many is the need for zero visibility exhaust. Many in the coach business feel that the vertical stack will draw more attention to the bus if the exhaust is visible. This point remains to be seen as many truck manufacturers and fleet operators feel otherwise and favor vertical exhaust where smoke is equal (and noticeable).

D. LSN Injectors

There is little doubt that the LSN injectors are responsible for major reductions in odor, smoke, and other gaseous emissions while resulting in slightly more nitric oxide. This conclusion was made three years ago and still stands. Shortly thereafter, the San Antonio Transit System began a program of replacement of S injectors by needle injectors and, as the LSN became commercially available, the improved injector parts were obtained. Replacement of injectors is made when injectors are normally removed for overhaul. Instead of replacing a worn out S with a rebuilt S, the San Antonio Transit System obtains from Weber Diesel Service a rebuilt unit with the

LSN injector features. The cost, as of March 9, 1971, on a straight exchange basis, was $32.00 per LSN injector with new LSN tip.

A new injector obtained from GM is $58.33 (4/9/71 price). The out-of-pocket cost is less than $32.00 per injector since the injector had to be replaced anyway and the net cost increase to obtain an LSN instead of a rebuilt S from Weber Diesel Service is $19.50 ($32.00 less $12.50 for rebuilt S with used S exchange or "core"). For a 6-cylinder engine, the net cost per bus, on a normal replacement basis, is $117.00. This results in one of the best cost-effectiveness ratios yet. The numerator of the ratio is near zero and the effectiveness is substantial. It must be mentioned that new LSN injectors are available in quantity from General Motors as well as from a number of diesel injection equipment companies. Rebuilt injectors as were obtained by the San Antonio Transit are available from a number of suppliers.

If injectors were replaced on a campaign basis, then both injector costs, i.e., $32.00 rebuilt or $58.33 new, $192.00 and $349.98 per six-cylinder engine, plus about 5-1/2 hr labor, at say $8.00/hour or $44.00, represent the cost per bus. This cost still results in a most attractive proposition relative to the significant effectiveness achieved to warrant immediate retrofit of all engines with these improved injectors. The durability of LSN injectors is considered as good as the S or N injectors and was demonstrated by the two-year test. Incidentally, all new engines manufactured by Detroit Diesel Division for truck and bus application are equipped with the LSN injectors beginning with the calendar year 1970 Federal smoke certified engine program. These injectors would not be used in normal production if their durability was questioned. Further delays in the use of these injectors in older style busses equipped with S injectors are not justified. Improvements by the LSN relative to the N injector are not substantial (see Ref. 5) and therefore the cost-effectiveness ratio will not be nearly as attractive.

To keep the LSN injectors performing as intended, more frequent adjustment of injector settings is recommended. A twice yearly schedule could net large benefits in maintaining low smoke levels. Using the factory-recommended dial indicator adjustment tool (cost approximately $75.00) the check and adjustment of injectors beyond, for example, 1.475 would take about 2-1/2 hr. Bus 707 illustrated how two injectors could change in adjustment with just 25,000 miles of operation, a change sufficient to negate the smoke improvements of the improved injector.

VII. EFFECT ON PUBLIC AWARENESS

The major intent of the EIP kit is to eliminate or reduce as far as possible the city bus as a factor in public annoyance. Noise, vibration, smoke, and odor have been the targets which, in the levels or concentrations experienced with uncontrolled buses, do not result in a health problem but are associated with public welfare. Except for nitric oxide, the diesel engine used in most city buses emits significantly small quantities of carbon monoxide and hydrocarbons relative to the gasoline engine. Some major items in the EIP kit address only the public awareness problem. The vertical stack is one such item, designed and employed to turn the exhaust noise and odor up and away from most observers.

The question must then be asked, will the EIP kit affect the annoyance to the public of city buses and thereby reduce complaints?

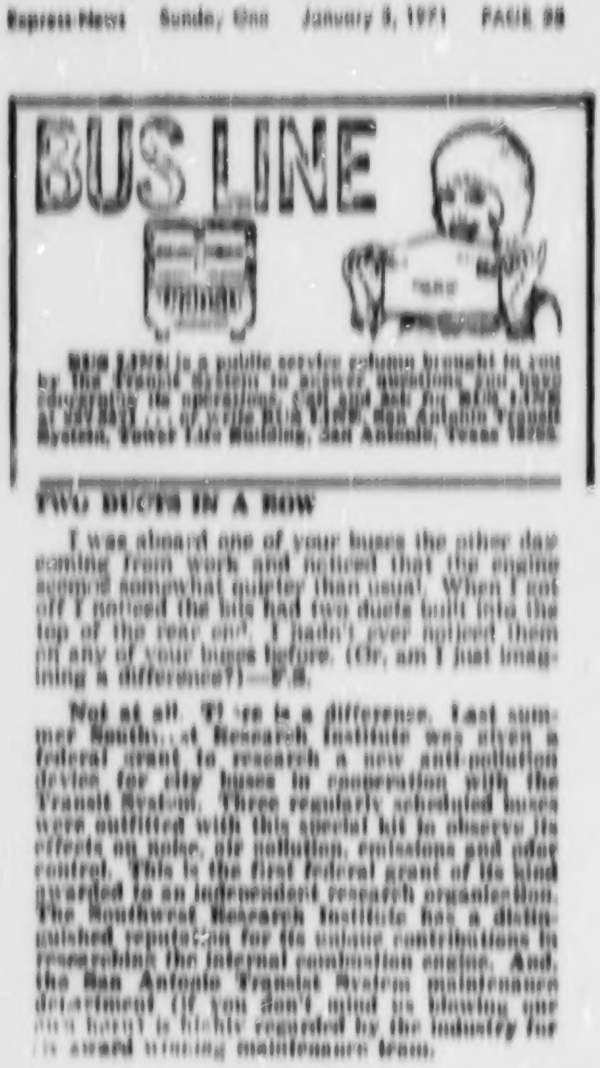
A. Noise

Interior noise reductions should be noticed especially in winter when the air conditioner is inoperative. Exterior noise reductions will be offset somewhat by increased engine speed during acceleration to upshift, a repeated condition. Depending on how much increase is made in a particular fleet, i.e., what the local population is accustomed to, the exterior noise factor could increase. Incidentally, exterior noise affects more people per day than does interior noise. And, people within a bus are there for the purpose of transportation and expect some noise and vibration, whereas the community population may infrequently or never ride public transporation yet have no recourse but to be exposed to its noise.

Several nice comments have been made by bus patrons regarding the decreased interior noise in the EIP-equipped buses. No specific comments have been received about exterior noise. However, this lack of comment may be tempered somewhat by the fact that only three out of several hundred San Antonio Transit buses are so equipped and a deterioration in upshift-downshift speeds can be expected to occur with time. One remark, published in a weekly column appearing in the San Antonio *Express* newspaper, is reprinted as an example of public concern.

B. Odor

The odor from diesel-powered city buses is probably the best studied diesel engine emission next to smoke. In some respects, it is more completely known about, specifically its public objectionability. In a separate, but companion EPA project to this long-range investigation of diesel emissions, of which EIP demonstration is a part, studies have been made of public opinion of dilute samples of diesel, bus-like odor. References 12 and 13 are suggested



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BUS LINE is a public service column brought to you by The Transit System to answer questions you have [illegible] its operations. [illegible] BUS LINE [illegible] San Antonio Transit System, Tower Life Building, San Antonio, Texas [illegible]

TWO DUCTS IN A ROW

I was aboard one of your buses the other day coming from work and noticed that the engine seemed somewhat quieter than usual. When I got off I noticed the bus had two ducts built into the top of the rear end. I hadn't ever noticed them on any of your buses before. (Or, am I just imagining a difference?)—F.S.

Not at all. There is a difference. Last summer Southwest Research Institute was given a federal grant to research a new anti-pollution device for city buses in cooperation with the Transit System. Three regularly scheduled buses were outfitted with this special kit to observe its effects on noise, air pollution, emissions and odor control. This is the first federal grant of its kind awarded to an independent research organization. The Southwest Research Institute has a distinguished reputation for its unique contributions in researching the internal combustion engine. And, the San Antonio Transit System maintenance department (if you don't mind us blowing our own horn) is highly regarded by the industry for its award winning maintenance team.

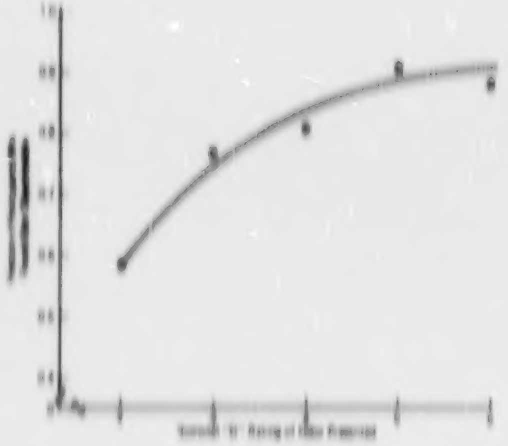


FIGURE 44. ODOR DOSE--PUBLIC RESPONSE TO BUS-LIKE DIESEL EXHAUST ODOR (Reference 7)

final reports worth reviewing on this subject. Two surveys, one in 1969 and one in 1970, tested over 5000 quota-sampled individuals according to the 1960 census in five cities. A special mobile odor facility, known as the *Sniffmobile*, was used to elicit responses to an odor very similar to diesel buses at a variety of intensities. The trained SwRI panel was used to calibrate the facility and odor levels in terms of the Turk kit.

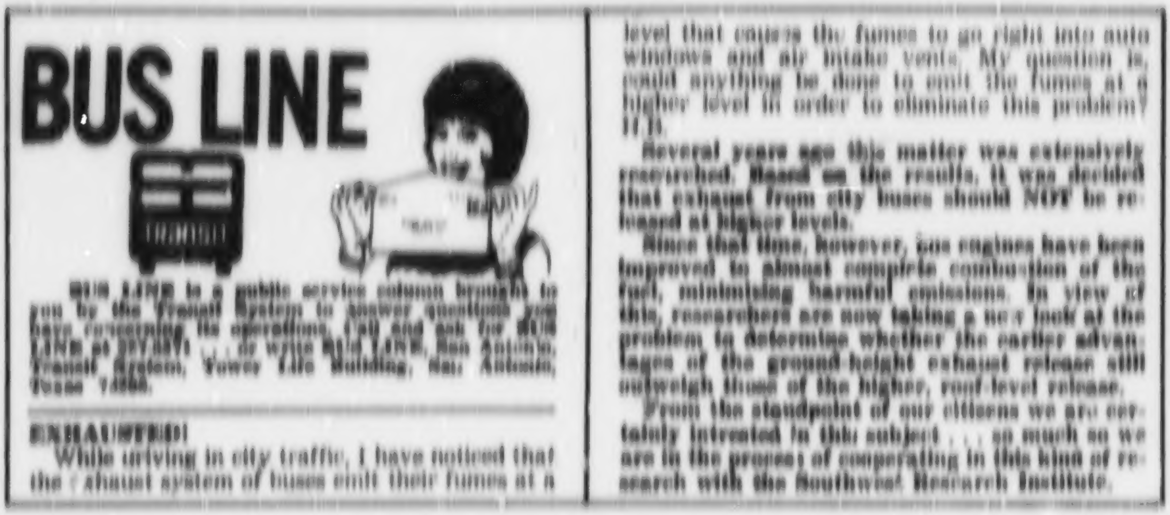
Among a number of other findings, the public opinion odor testing resulted in a dose-response relationship illustrated in Figure 44. This is typical of the upper portion of the usual "S"-type dose-response odor curve. Applying the first interim inspection results of the EIP kit to this curve, it can be seen that an overall reduction (all buses and conditions averaged, equal weight each condition) from D-5.3 to D-4.5 results in a fairly small reduction in public objectionability. The reduction is on the order of 10 percent.

Reproduced from best available copy.

Incidentally, D-5.3 is about 0.6 to 0.7 D-numbers below the level of odor that was experienced in nearby operations of old buses powered by the 71 series Detroit Diesel engine with "S" injectors and horizontal tailpipes. This difference is attributed to the relatively new condition of the engines tested in this project. The overall D reduction from 5.3 to 3.5 compares nicely with the previously reported D reduction for LSN injectors from D-5.9 to D-4.2 for Bus 677. Please refer to Reference 6, Section III Fleet Test of LSN Injectors for details.

When it is recognized that odor generates a subjective response that increases less as odor strength is increased, then the relationship of Figure 44 may be understood. The reductions afforded by the LSN injectors make a necessary and good start toward reducing public awareness but alone cannot be expected to grossly reduce complaints. The EIP vertical stack, by dispersing and diluting the exhaust more than the horizontal exhaust pipe, will further reduce public awareness of the odor. Studies have not been made to quantify the extent the vertical stack, when combined with the remainder of the kit, will reduce odor noticeability. This is a case where effects measured separately will not necessarily be directly additive. There is little doubt that the vertical stack will reduce objectionability from that possible by the LSN injectors alone and will most likely reduce complaints about exhaust odor.

In the previous section, a discussion was given the pros and cons of stack placement and exhaust smoke. There is little doubt that reducing and maintaining smoke at or near the visibility limit will be the goal for the EIP vertical stack. This will be necessary, many feel, to keep awareness of smoke from negating the odor reduction. The following clipping indicates that people in the community do notice and are aware of the exhaust location on city buses.



BUS LINE

BUS LINE is a public service column brought to you by the Transit System to answer questions you have concerning its operations. Call and ask for BUS LINE at [illegible] . . . or write BUS LINE, San Antonio Transit System, Tower Life Building, San Antonio, Texas [illegible].

EXHAUSTED!

While driving in city traffic, I have noticed that the exhaust system of buses emit their fumes at a level that causes the fumes to go right into auto windows and air intake vents. My question is, could anything be done to emit the fumes at a higher level in order to eliminate this problem? H.B.

Several years ago this matter was extensively researched. Based on the results, it was decided that exhaust from city buses should NOT be released at higher levels.

Since that time, however, bus engines have been improved to almost complete combustion of the fuel, minimizing harmful emissions. In view of this, researchers are now taking a new look at the problem to determine whether the earlier advantages of the ground-height exhaust release still outweigh those of the higher, roof-level release.

From the standpoint of our citizens we are certainly interested in this subject . . . so much so we are in the process of cooperating in this kind of research with the Southwest Research Institute.

VIII. STATUS OF EIP

As of this writing, the following is known regarding the status of the EIP kit and other items pertinent to the reduction of emissions from city buses. Though probably incomplete, this section will attempt to summarize some key points such as the intake air filter and improved rocker arm and the policy regarding DOT funding.

A. Air Intake System

With the completion of the two-year demonstration with the San Antonio Transit System, all the originally intended test work has been completed. References 15, 16 and 17 along with this final report constitute the test data obtained and its analysis. As sometimes occurs with a field demonstration of this magnitude, some items were found to be disadvantageous and, in essence, a detriment to the kit. The inlet air filter was an example of a change in the vehicle that promised to be quite beneficial because of larger size, presumably longer filter life with improved engine breathing, lower inlet air restriction, etc. The relocation of the air inlet point to the right rear corner of the bus, See Figure 6 instead of the stock bus inlets caused extremely lower filter life, increased clogging and inlet restriction.

Replacement of the dry type air cleaner elements was found to be substantially more expensive than the stock wet-type oil bath air cleaner. The stock bus air inlets are located on each side of the bus, higher than the EIP and forward of the rear corner as shown in Figure 6. The San Antonio Transit System conducted a separate test of filter life to prove their point and stated the reason was the inlet was traveling in an atmosphere of dirt and trash from the vehicle and tires operating next to the curb and creating a partial vacuum at the rear of the bus. A copy of the San Antonio Transit System letter of December 10, 1971, and their report is included in Appendix G for review.

San Antonio Transit compared the EIP air filter system to the standard system on an unmodified bus. The conclusions were quite interesting as well as some of the projections which essentially stated that the EIP air filter system gained weight at a rate 20 times faster than a standard air cleaner system on an unmodified bus, and it was projected that if the test air cleaner element in the EIP system could be arranged to gain dirt at the same rate as the unmodified bus, the larger element could be expected to last approximately half the life of the bus. It was concluded that the only difference between the two systems other than the size of the air cleaner is the location of the air intake.

As a result of the experience of San Antonio Transit, and the other operators of the EIP kit in San Francisco and Washington, D.C., a redesign of the air inlet was made and a different type dry air cleaner element was specified to give longer life. The molded fiberglass shroud and the pre-filter are shown in Figure 9 and were installed on all three of the SAT EIP buses on February 25, 1972. The plastic shroud is designed to draw air in from the side of the bus rather than from the rear.

The redesigned and modified air inlet system seemed to reduce problems of filter life and excessive inlet restriction. The shroud and the exhaust pipe covering on the left rear corner of the bus have all but made washing of the rear of the bus impossible except by hand. The washing machine is unable to work on the rear corners of the bus without occasionally ripping off a shroud or brush and this is of some concern to the transit operator.

B. Improved Injector Rocker Arms

Much emphasis was given injector timing and the proper maintenance of injector setting by GM in the EIP proposals. The results of this two-year test and other similar tests have adequately confirmed the effect of late injection on increased smoke for example. Injector setting deteriorated during this two year test sufficiently to warrant an unscheduled adjustment back to recommended 1.470 between the third interim and final inspection at approximately 18 months and 90,000 miles.

The higher opening pressures of the needle type injector places higher stress on the injector actuation mechanism than with the old style "S" injectors. One component that is subject to as much or more wear than the others in the actuation system is the bronze roller on the rocker arm injector actuator. Included in Appendix G is a copy of the GM service bulletin dated July 14, 1971, describing an improved item for use on all coaches instead of the former item. This item was not included in the original EIP kit as it was not available at that time. There is little doubt that it should be if it will reduce actuator system wear and preserve the injector setting.

As a result of several telephone conversations and in response to a letter by Mr. Normal Hill of San Antonio Transit System dated February 3, 1972, a letter was forwarded to Mr. Charles Daniels of UMTA by Mr. E. R. Stokel of General Motors. A copy of this letter, dated March 7, 1972, is included in Appendix G. In essence, the suggestion of replacing not only crown valve S injectors with L8N units and the rocker arm with the improved item was formalized by General Motors to the Department of Transportation. Whether it will be included by UMTA in the kit and qualify for Federal assistance is not known at this writing. The cost, per the March 7 letter, is $5.43 each. There would be essentially no cost involved in their installation if done at the same time the injectors are replaced since the rocker arm assembly must be removed to replace the injectors.

C. Federal Assistance

The underlying reason for the several fleet test demonstrations of EIP equipped city buses was to determine whether all or part of the retrofit kit should qualify for Federal assistance funds through the UMTA of the Department of Transportation. A policy was published January 18, 1972, by the Department of Transportation which in effect said UMTA would assist the local operator in retrofitting buses with the L&N injector and other components of the kit except the catalytic muffler. With regard to new buses, it specifies that no support will be given the catalytic muffler and the other items in the kit will be optional with the bus property except L&N injectors will be required. It should be pointed out that L&N injectors have been required on all Detroit Diesel powered vehicles beginning with the 1970 model year under the Federal smoke certification law administered by the Environmental Protection Agency. It is not possible for GM to sell an engine for truck or bus application without the L&N injectors for model years 1970 through 1973. It is uncertain what injector style will be used in 1974 and 1975 at this time. A copy of the DOT UMTA policy statement is included in Appendix G for ready reference.

It would seem important that the $5.38 improved rocker arm item should be replaced at the same time as L&N injectors are replaced. There is no increase in labor costs and the injector rocker arm assembly has to be removed anyway in order to get to the injectors. The substantially increased opening pressure of the N type injectors is expected to cause the current bronze bushings to wear out faster than with the crown valve injectors of the old type bus. The cost of the parts would be far less than the more often and unpredictable injector timing and adjustment. The January 18 EIP kit policy memo makes no mention of these rocker arms. This was brought to the attention of the cognizant Project Officers, both EPA and UMTA in a letter dated December 14, 1971.

Hopefully, it is not too late to include this item in the authorized UMTA participation. It should be installed along with the L&N injectors in any retrofit program. In light of the apparent need for improved rocker arms, it is suggested that bus properties do as San Antonio Transit and request financial assistance for the new style rocker arms at the same time applying for the L&N injector support.

D. Summary

The reduction of emissions from the city bus did not begin nor end with the EIP kit proposal. It is a never ending effort to realize pollution-free operation at reasonable cost. During the course of the two year program, gaseous emission standards for diesel powered vehicles have been enacted by California and the Federal government and the Federal smoke limits have been lowered to cite some of the requirements diesels must now live with.

Control technology for reduction of oxides of nitrogen and smoke is receiving increased attention and may well affect the other emissions of the city bus as well as the cost of operation.

IX. SUMMARY

Three GM city buses have been equipped with the GM Truck and Coach Environmental Improvement Proposal retrofit kit and operated approximately 115,000 miles each. Noise tests were made before and after kit installation and interior noise reductions, claimed by the manufacturer, were confirmed. Exterior noise may increase if engine-transmission upshift changes are necessary by the operator to meet the recommendations of the kit.

With regard to odor, smoke, and other tailpipe emissions, the LSN improved needle injectors were found to give consistently and substantially lower smoke, odor, hydrocarbons, carbon monoxide, and oxygenates throughout the 2 year test period. The catalytic muffler, one item included in the EIP kit, was found to be largely ineffective in reducing emissions. This lack of performance was found for all buses, conditions, and, except for one bus when new, all inspections. As a result, this item was deleted from the test after approximately 40,000 test miles and test data was obtained at the beginning, after five and ten months of running.

One small disadvantage of the otherwise splendid and highly attractive cost-effectiveness of the LSN injectors was the initial 10- to 15-percent increase in nitric oxide emissions. These increases diminished somewhat as mileage was accumulated, but are expected to mostly remain if the injector adjustments are made more often. The vertical stack, also featured in the EIP kit, has the effect of making odor and noise less noticeable to the man-in-the-street, but may make smoke more visible. These findings are in agreement with component studies conducted during the past three years with the catalytic muffler and improved injectors.

In summary, investigation of the claims for the EIP kit has been made and the major findings of the manufacturer confirmed. The LSN injectors appear highly advisable for immediate retrofit to all buses equipped with N-type injectors. The LSN injector is standard equipment on all 1970 and later GM 2-stroke diesel engines used in on-highway operation. The catalytic muffler component does little to improve exhaust emissions and appears unjustified. The vertical stack has certain obvious advantages in diluting the exhaust and thereby reducing the noticeability of odor. It will require smoke at or near the limit of visibility to be successful.

X. RECOMMENDATIONS

The following recommendations are offered for consideration as a result of the two year demonstration and related previous experience with the control of emissions from diesel buses.

1. Repeating a recommendation made several years ago, on the occasion of the first back-to-back test of the then experimental LSN injectors, immediate retrofit of all Detroit Diesel engines equipped with "S" or crown valve type injectors is justified. Replacement of N with LSN injectors has less priority since the improvements in emissions with LSN instead of N injectors is slight. This recommendation applies only to the pre 1970 model year vehicles since engines built since 1970 have been smoke certified by the EPA with LSN injectors.

2. Though not part of the original EIP kit, the addition of engine components which can improve or maintain the emissions performance over a longer time period should be considered for support by DOT and encouragement given the bus property. One example is the improved injector rocker arm actuator component which is subject to a higher wear rate when LSN injectors are used. This component should be considered as part of the retrofit kit and be installed when the injectors are replaced.

3. Fuel has been shown to adversely affect odor and smoke. Grade DF-1, kerosene type diesel or commonly called NO 1 diesel fuel, is recommended for use in city buses. Though it is an expensive way to derate the engine for lower smoke, the resulting odor is usually less acrid, penetrating and objectionable.

4. Injector setting should be checked every six months and if greater than 1.470 by more than say ± 0.005, they should be readjusted to the EIP specified 1.470 timing. This will be necessary to minimize the effect of injector wear and late injection on increased smoke.

5. Two items should have been addressed by the kit and were not. They were an improved transmission governor to replace the electro-mechanical unit. An improved governor is needed to maintain the upshift and downshift speeds of the engine and realize the positive benefits of this feature of the EIP kit. The other item is the noise from the old style hydraulic drive air-conditioning units. This is a substantial noise source in many of the older buses and the slight reductions found by the EIP kit were completely masked by the air conditioner noise.

6. The vertical exhaust and air intake systems have good and bad features. For used buses, there may have been little choice in the design of these systems. However, locating the vertical exhaust blocked one of the conventional air inlets and the desire to balance the rear appearance of the bus prompted the air inlet to be positioned in the right rear back corner

of the vehicle. Only through use of another external appendage, a plastic shroud, has more acceptable filter element life been achieved. It would seem that new buses should not suffer some of these design deficiencies which may have to be tolerated with used buses. In any event, their effect on emissions is nil except for greater dilution of the exhaust making the odor less noticeable. Neither component in itself reduces emissions and therefore their use should be left to the option of the purchaser and operator, the bus property.

7. Catalytic mufflers have great possibilities with certain engines in certain applications. Clearly the scavenged two-stroke diesel engine powering a coach in city stop-and go transit operation is not the proper application for the particular catalyst and catalytic muffler. Apparently, there is insufficient heat energy in bus exhaust to allow the catalyst to function as desired. The catalyst, dropped from this project after 40,000 miles, should not be retested in this application. Other catalysts, of the precious metal variety, may emerge and should be considered as in the past.

8. Diesel engine emissions control technology is in its infancy, but is receiving more attention from government and industry. A continuing effort of screening test, short field test and long term demonstration of control concepts should be continued. Where promising approaches or strategy are identified, sufficient laboratory and analytical studies should be made to verify and substantiate the claims and to encourage the designer and developer of the device.

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APPENDIX A

DESCRIPTION OF VEHICLES, EMISSIONS, AND NOISE TEST PROCEDURES

TABLE A-1. DESCRIPTION OF TEST VEHICLES AND ENGINES

Bus Number	702	704	707
Vehicle Data			
Manufacturer	Truck and Coach Div. GMC	Truck and Coach Div. GMC	Truck and Coach Div. GMC
Model	TDH-4519	TDH-4519	TDH-4519
Chassis number	042	044	160
Source	S.A. Transit	S.A. Transit	S.A. Transit
Air conditioned	Yes	Yes	Yes
Year	1963	1963	1964
Miles	368,356	357,063	484,584
Engine Data			
Manufacturer	Detroit Diesel Div. GMC	Detroit Diesel Div. GMC	Detroit Diesel Div. GMC
Engine number	6V-71E	6V-71E	6V-71E
Cycles	2	2	2
Hp rating at 2100 rpm	200	200	200
Cylinders/Arrangement	6/V	6/V	6/V
Compression ratio	17:1	17:1	17:1
Displacement, cu. in.	425.6	425.6	425.6
Bore and stroke, in.	4-1/4 × 5	4-1/4 × 5	4-1/4 × 5
Number of exhaust valves	4	4	4
Type injectors	Unit	Unit	Unit
Injector size	60N	60N	60N
Engine Maintenance			
Trial miles (start of test)	368,356	357,063	484,584
Miles since injector change	22,356	36,620	19,884
Miles since major overhaul	38,625	36,620	19,884
Drive Line Data			
Transmission	Allison V-H	Allison V-H	Allison V-H
Number of forward speeds	2	2	2
Rear axle	Rockwell Standard	Rockwell Standard	Rockwell Standard
Rear axle ratio	4.714:1	4.714:1	4.714:1
Number of drive axles	1	1	1
Tire size	11.00 × 20	11.00 × 20	11.00 × 20

ENGINE MANUFACTURERS ASSOCIATION

PROPOSED
DIESEL EMISSION APPROVAL PROCEDURE

for the

STATE OF CALIFORNIA
AIR RESOURCES BOARD

prepared by

THE GASEOUS EMISSION SUBCOMMITTEE
of the
EMISSION STANDARDS COMMITTEE

Draft #7 - (Incorporates changes and additions from
12-11-69 Joint Meeting, EMA Meetings on
2-24-70, 3-18-70 and 4-21-70 and Joint
Meeting of 4-29-70)

Introduction

A. The following procedure will be used in the testing program to determine the conformity of new diesel engines, used in heavy duty vehicles, with the standards set forth in this procedure.

B. The standards for hydrocarbons, nitric oxide, and carbon monoxide are expressed in mass units of grams per brake horsepower hour and represent the mass rate of emissions per unit of work accomplished.

C. Certification of conformity with the standards is based on engine testing and certification. In addition, vehicle manufacturers must also certify that vehicle models manufactured for sale in California use certified engines.

D. The engines to be tested for certification are selected according to families of similar design.

E. For certification the emissions are measured during an engine dynamometer test on a three-speed, thirteen-mode, steady state cycle with equal weighting factors for ten of the modes. The cycle is a composite of many typical cycles for heavy duty vehicles.

F. The emissions are continuously measured in accordance with SAE Recommended Practices using non-dispersive infrared equipment for CO and NO and a heated flame ionization analyzer for HC and are measured during steady state engine operation partly to allow the hydrocarbon emissions to stabilize. The mass rate of emissions is calculated from the emission concentration data and the exhaust flow data for each mode. The final emissions are calculated by dividing the summation of the weighted mass rate emissions by the summation of the weighted brake horsepower values for the cycle.

G. A chassis dynamometer procedure is also included for field surveillance testing. This procedure requires direct measurement of fuel flow and emissions concentration values. Engine brake horsepower and exhaust flow are determined from engine manufacturers data. The duration of each of the 13-modes has been minimized to reduce the total test time and tire durability problems. Because the horsepower and exhaust flow are estimated and because of the greater difficulty of controlling the test conditions, this procedure is inherently less accurate than the engine dynamometer procedure.

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A. General Provisions

I. Applicability

The provisions of Sections A, B and C are applicable to all new diesel-powered, heavy-duty vehicles manufactured on or after January 1, 1973, to be sold in California.

II. Definitions

a) "Heavy-duty vehicle" means a motor vehicle designed primarily for transportation of persons or property on a street or highway and rated more than 6000 pounds gross vehicle weight.

b) "Gross vehicle weight" means the manufacturers gross vehicle weight rating.

c) "Diesel engine" means a compression ignition engine used as the propulsion unit for a heavy duty vehicle.

d) "Exhaust emission" means substances emitted to the atmosphere from any opening downstream from the exhaust port of an engine.

e) "Rated brake horsepower" means the maximum brake horsepower output of an engine as stated by the manufacturer.

f) "Rated speed" means the speed at which the manufacturer specifies the rated brake horsepower of an engine.

g) "Rated torque" means the maximum torque produced by an engine as stated by the manufacturer.

h) "Peak torque speed" means the speed at which the engine develops maximum torque.

i) "Percent load" means the fraction of the maximum available torque at that engine speed.

j) "Intermediate speed" means the peak torque speed or 60% of rated speed, whichever is higher.

III. Abbreviations

The abbreviations used in this part have the following meanings in both capital and lower case:

ASTM = American Society for Testing and Materials
BHP = Brake Horsepower
BSHC = Brake Specific Hydrocarbons
BSNO = Brake Specific Nitric Oxide
BSCO = Brake Specific Carbon Monoxide
CO_2 = Carbon Dioxide
CO = Carbon Monoxide
Conc = Concentration
cfm = Cubic Feet Per Minute
EP = End Point
Exh = Exhaust
F = Fahrenheit
ft = Feet
g = Gram (s)
GVW = Gross Vehicle Weight
HC = Hydrocarbon (s)
H_2 = Hydrogen
Hg = Mercury
HP = Horsepower

hr = Hour

IBP = Initial Boiling Point

in. = Inch(es)

Int = Intake

lb = Pound (s)

Max = Maximum

ml = Milliliters

min. = Minimum - Minute

M = Mass

N_2 = Nitrogen

NO = Nitric Oxide

O_2 = Oxygen

ppm = Parts Per Million by Volume

rpm = Revolutions Per Minute

SAE = Society of Automotive Engineers

sec = Second

WF = Weighting Factor

F.I.D. = Flame Ionization Detector

° = Degrees

% = Percent

Σ = Summation

IV. Standards

a) Exhaust emissions from diesel engines subject to this subpart shall not exceed:

1. Hydrocarbons - ___grams per brake horsepower hour.
2. Nitrogen oxides - ___grams of nitric oxide per brake horsepower hour.
3. Carbon monoxide - ___grams per brake horsepower hour.

b) The standards set forth in paragraph a) of this section refer to exhaust emissions measured under the conditions set forth in the "Engine Dynamometer Test Procedure", Section C.

B. Approval of Engines and Vehicles

I. Application for Approval

a) An application for a Resolution of Approval to these regulations may be made to the Air Resources Board by any engine or vehicle manufacturer.

b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall contain the information required by the following sections.

II. Vehicle Approval

a) The vehicle manufacturer shall provide the following in his application:

1) Identification and description of the vehicle models with respect to which approval is requested.

2) Identification and description of the engines to be used in these vehicle models.

3) The engine manufacturers' Resolutions of Approval or pending application for these engines shall be referenced.

III. Engine Manufacturer Approval

a) The engine manufacturer shall provide the following in his application:

1) Identification and description of the engines and engine families with respect to which approval is requested as follows:

i) Engine Family Selection

The engines for which approval is requested shall be divided into engine families on the basis of design features. Engine models may be placed in one engine family when they use the same combustion cycle (2-cycle or 4-cycle), combustion system (open chamber, pre-chamber, or M-system, etc.) and method of air aspiration (natural, turbocharged, supercharged). An engine family may consist of models with different numbers of cylinders and cylinder configuration (in-line or Vee) and may have different bore or stroke dimensions if the models in a given cylinder configuration use the same basic cylinder block.

ii) Emission Engine Selection

One engine of each family shall be tested to determine the emissions characteristics of the family. The engine selected shall be the model with the highest projected sales volume for the United States. If the projected United States sales volume for an engine family for the calendar year for which certification is requested is less than ___ engines, no emissions test shall be required for that engine family.

2) A description of emission control systems or devices including such engine components and adjustments which are critical to the control of emissions.

3) Emission data on such engines tested in accordance with the applicable emission test procedures and evidence demonstrating the durability of the system.

4) A statement that the engines with respect to which data are submitted have been tested in accordance with the applicable test procedures, that they meet the requirements of such tests and that, on the basis of such tests, they conform to the requirements of the regulations.

5) A statement of recommended maintenance procedures and equipment necessary to assure that the vehicle and engine in operation conform to the regulations and a description of the program for training of personnel for such maintenance.

6) An agreement to make one or more of the test engines and instrumentation available for emissions testing at the manufacturer's facility upon request of the Executive Officer when such request is made not later than one month after submission of the Application for Approval. Any such testing requested by the Executive Officer will be scheduled as promptly as possible subject to the availability of personnel and facilities to conduct such tests.

C. Engine Dynamometer Test Procedure

I. Introduction

a) The following procedure shall be used in the testing program to determine the conformity of diesel engines with the applicable standards set forth in Part A.

b) The test procedure consists of a prescribed sequence of engine operating conditions on an engine dynamometer with measurement of hydrocarbons, nitric oxide, and carbon monoxide during thirteen steady-state modes with five modes at rated engine speed, five modes at an intermediate engine speed, and three modes at idle speed.

II. Fuel Specification

a) The diesel fuels employed shall be clean and bright, with pour and cloud point adequate for operability. The fuels may contain non-metallic additives as follows: cetane improver, metal deactivator, anti-oxidant, dehazer, anti-rust, pour depressant, dye, and dispersant.

b) Fuel meeting the following specifications shall be used in exhaust emission testing:

Item	ASTM No.	Range
Cetane	D-613	42-50
Distillation range	D-86	
IBP °F		340-400
10% point °F		400-460
50% point °F		470-540
90% point °F		550-610
EP °F		580-660
Gravity ° API	D-287	33-37
Total sulfur % max.	D-129	0.2-0.5
Flash point °F-Min.	D-93	130
Viscosity, centistokes	D-445	2.0-3.2

III. Instrumentation

a) Instrumentation shall be provided to measure the following engine operating data:

1) Engine speed: rpm
2) Torque: lb-ft
3) Mass fuel consumption: lb/min
4) Observed barometer: in. Hg
5) Water vapor pressure: in. Hg
6) Intake air restriction: in. water
7) Exhaust back pressure: in. Hg
8) Intake air temperature: °F
9) Fuel temperature at pump inlet: °F

b) Instrumentation shall be provided to measure the engine intake air flow or exhaust flow and the concentration of carbon monoxide, nitric oxide, and hydrocarbons in the exhaust as follows:

1) The determination of the carbon monoxide and nitric oxide concentrations shall be accomplished using sampling and analysis by non-dispersive infrared methods using the SAE Recommended Practice # ___ titled "Measurement of Carbon Dioxide, Carbon Monoxide, and Oxides of Nitrogen in Diesel Exhaust".

2) The determination of the hydrocarbon concentration shall be accomplished using sampling and analysis by a heated flame ionization detector method using the SAE Recommended Practice #___ titled "Continuous Hydrocarbon Analysis of Diesel Exhaust".

3) The determination of the intake air flow or exhaust flow shall be accomplished using the SAE Recommended Practice #___ titled "The Measurement of Intake or Exhaust Flow in Diesel Engines".

IV. Test Conditions

a) The following ranges of test conditions shall be maintained during exhaust emission testing:

1) Intake air temperature: 85°F ± 15°F

2) Barometric pressure: 29.4 in. Hg ± 1 in. Hg

3) Fuel temperature at fuel pump inlet: 100°F ± 10°F

4) Intake restriction: between the manufacturer's published maximum limits of clean air cleaner restriction and dirty air cleaner restriction.

5) Exhaust restriction: Maximum permitted by the engine manufacturer as published in his sales and service literature. The restriction shall be set within ± 0.2 in. Hg while the engine is operating at maximum horsepower.

V. Test Procedure for Exhaust Emissions

a) The engine shall be run-in according to the manufacturer's recommendation for break-in of an engine for engineering performance testing.

b) Pre-test Conditioning Procedure

1) Operate the engine at 90% ± 10% load at 90% ± 10% of rated speed for a 50-hour conditioning period.

2) The engine may be shut down at the end of or during the 50-hour conditioning period.

c) Emissions Measurement Procedure

1) Start the engine and warm it up. Complete warm-up at rated speed and full load for at least ten minutes or until all temperatures and pressures have reached equilibrium.

2) Operate the engine at the following modes:

Engine Speed	Percent Load ± 2%
Low idle	0%
Intermediate	2%
Intermediate	25%
Intermediate	50%
Intermediate	75%
Intermediate	100%
Low idle	0%
Rated	100%
Rated	75%
Rated	50%
Rated	25%
Rated	2%
Low idle	0%

3) Operate the engine for ten minutes in each mode, allowing up to one minute for engine speed or load changes, at least eight minutes for emission stabilization, and one minute for emission measurement.

i) Record the following for the full ten minutes in each mode on a strip chart recorder:

   a) hydrocarbon analyser output
   b) carbon monoxide analyser output
   c) nitric oxide analyser output

ii) Record the following data during the last five minutes in each mode:

   a) engine speed
   b) engine torque or dynamometer load units
   c) intake air temperature
   d) exhaust back pressure
   e) intake restriction
   f) fuel temperature

iii) Record data during the last five minutes in each mode in order to calculate the following:

   a) intake air flow or exhaust flow
   b) fuel flow

4) Shut the engine down for at least eight hours. Then, repeat the emissions measurement procedure, Section C,V,(c).

d) Chart Reading

1) Locate the last sixty seconds of each mode and determine the average chart reading for hydrocarbons, carbon monoxide, and nitric oxide over this one minute period.

2) Determine the concentration HC, CO, and NO (HC_{conc}, CO_{conc}, NO_{conc}) in each mode from the chart reading (item C,V,(d)(1)) and from the calibration data. Average the values obtained during the three idle modes.

e) Calculations

1) The test results for the two emission test sequences shall be derived through the following steps:

i) Calculate the mass emissions for HC, CO, and NO in grams per hour for each mode as follows:

a) $HC_{mass} = 0.0132 \times HC_{conc}$ (ppm - carbon) x exh mass (lb/min)

b) $CO_{mass} = 0.0263 \times CO_{conc}$ (ppm) x exh mass (lb/min)

c) $NO_{mass} = 0.0282 \times NO_{conc}$ (ppm) x exh mass (lb/min)

ii) Calculate the weighted BHP, HC_{mass}, CO_{mass}, and NO_{mass} for each mode by multiplying the values of each by the weighting factor for that mode. The weighting factors are 0.20 for the average idle mode and 0.08 for all other modes.

iii) Calculate the brake specific emissions for HC, CO, and NO for each set of data as follows:

$$BSHC = \frac{\Sigma(HC_{mass} \times WF)}{\Sigma(BHP \times WF)}$$

$$BSCO = \frac{\Sigma(CO_{mass} \times WF)}{\Sigma(BHP \times WF)}$$

$$BSNO = \frac{\Sigma(NO_{mass} \times WF)}{\Sigma(BHP \times WF)}$$

iv) Average the brake specific emissions from the two test sequences to compare to the standards.

D. Field Surveillance Chassis Dynamometer Test Procedure

I. Introduction

a) The following procedure may be used in the field surveillance testing of diesel-powered, heavy-duty vehicles.

b) The test procedure consists of a prescribed sequence of engine operating conditions using a vehicle chassis dynamometer with measurement of hydrocarbons, nitric oxide, and carbon monoxide during the same thirteen modes as used in the engine dynamometer procedure except the operating time in each mode is shortened to minimize tire failure problems.

c) This test procedure is similar to the engine dynamometer procedure except that the engine exhaust flow and brake horsepower are obtained from the engine manufacturers' data and fuel rate measurements during the test. Because of this and the greater difficulty in controlling test conditions, this procedure is inherently less accurate than the engine dynamometer procedure.

II. Fuel Specification

a) The fuel used for this procedure shall meet the same specifications required for the engine dynamometer procedure (Section C, II).

III. Instrumentation

a) Instrumentation shall be provided to measure the following:

1) Engine speed: rpm
2) Observed barometer: in. Hg
3) Water vapor pressure: in. Hg
4) Intake air restriction: in. water
5) Exhaust back pressure: in. Hg
6) Intake air temperature: °F
7) Fuel temperature at pump inlet: °F

b) Instrumentation shall be provided to measure the concentration of carbon monoxide, nitric oxide, and hydrocarbons in the exhaust as follows:

   1) The determination of the carbon monoxide and nitric oxide concentrations shall be accomplished using sampling and analysis by nondispersive infrared methods using the SAE Recommended Practice #__ titled "Measurement of Carbon Dioxide, Carbon Monoxide, and Oxides of Nitrogen in Diesel Exhaust" except the time in mode shall be as prescribed in Section D,V(c).

   2) The determination of the hydrocarbon concentration shall be accomplished using sampling and analysis by a heated flame ionization detector method using the SAE Recommended Practice #__ titled "Continuous Hydrocarbon Analysis of Diesel Exhaust" except the time in mode shall be as prescribed in Section D, V(d)(4).

c) Equipment shall be provided to measure the mass fuel consumption rate and to control the temperature of the fuel supplied to the engine. The fuel rate instrumentation must provide a continuous indication of fuel rate (weigh tank systems are not satisfactory). A system incorporating calibrated rotometers (fuel viscosity and temperature affect calibration) or a mass flow meter, a heat exchanger, and float tank similar to that shown in Figure 1 is satisfactory.

IV. Test Conditions

a) The following ranges of test conditions should be maintained as closely as possible during exhaust emission testing: deviations from these conditions will cause increasing errors in brake specific emissions values.

1) Intake air temperature: 85° ± 15° F

2) Barometric pressure: 29.4 in. Hg ± 1 in. Hg

3) Fuel temperature: 100° F ± 10° F

4) Intake restriction: between the manufacturers' published maximum limits of clean air cleaner restriction and dirty air cleaner restriction.

5) Exhaust restriction: typical encountered in the vehicle but no higher than manufacturers' published limit.

V. Test Procedure for Exhaust Emissions

a) Pre-Test Conditioning

Operate the vehicle on the chassis dynamometer with the engine at 85 ± 10% of rated speed and 50 ± 10% of maximum rear wheel horsepower at that speed for at least 15 minutes or until the transmission and rear axle temperatures have stabilized.

b) Selection of Test Conditions

1) Measure the maximum fuel rate for the test engine at the rated and intermediate engine speeds.
2) Obtain curves of engine brake horsepower and exhaust flow as functions of fuel rate for the engine model being tested from the engine manufacturer (Figures 2 and 3).
3) Use the brake horsepower vs. fuel rate data (Fig. 2) to estimate the maximum brake horsepower produced by the test engine at the rated and intermediate speeds. These are the 100% load conditions to be used during the test.
4) Calculate the engine brake horsepower at 75, 50, and 25% load for rated and intermediate speeds using the estimated maximum brake horsepower values from D,V(b)(3) above.
5) Determine the fuel rates associated with the engine brake horsepower values calculated in D,V(b)(4) above from Fig. 2.

c) Emissions Test Procedure

1) Warm up engine, transmission and rear axle by operating at rated engine speed and 30-50 mph for at least 15 minutes or until engine oil and transmission temperatures have stabilized.

2) Record the barometer and vapor pressure at the beginning of the test.

3) Operate the engine at the following modes using fuel rate values within ±5% of the values calculated in Section D,V,(b).

Engine Speed	Percent Load
Low Idle	Declutched
Intermediate	Declutched
Intermediate	25%
Intermediate	50%
Intermediate	75%
Intermediate	100%
Low Idle	Declutched
Rated	100%
Rated	75%
Rated	50%
Rated	25%
Rated	Declutched
Low Idle	Declutched

4) Operate the engine for three minutes in each mode allowing up to one minute for engine speed or load changes, at least one minute for emission stabilization, and one minute for emission measurement. Record the following data during the final two minutes in each mode:

a) Hydrocarbon analyzer output
b) Carbon monoxide analyzer output
c) Nitric oxide analyzer output
d) Engine speed
e) Fuel flow rate
f) Fuel temperature at pump inlet
g) Intake air temperature
h) Intake air restriction
i) Exhaust restriction

d) Chart Reading

1) Locate the last sixty seconds of each mode and determine the average chart reading for hydrocarbons, carbon monoxide, and nitric oxide over this one minute period.

2) Determine the concentration of HC, CO, and NO (HC_{conc}, CO_{conc}, NO_{conc}) in each mode from the chart reading D.V(d)(1) and from the calibration data. Average the three idle modes.

3) Determine the engine brake horsepower and mass exhaust flow from the manufacturer's data using the fuel rate measured during each mode from Figures 2 and 3.

e) Calculations

1) The test results for the emissions test sequences shall be derived through the following steps:

i) Calculate the mass emissions for HC, CO, and NO in grams per hour for each mode as follows:

$HC_{mass} = 0.0132 \times HC_{conc}$ (ppm-carbon) $\times$ exh mass (lb/min)

$CO_{mass} = 0.0263 \times CO_{conc}$ (ppm) $\times$ exh mass (lb/min)

$NO_{mass} = 0.0282 \times NO_{conc}$ (ppm) $\times$ exh mass (lb/min)

ii) Calculate the weighted BHP, HC_{mass}, CO_{mass}, and NO_{mass} for each mode by multiplying the value of each by the weighting factor for that mode. The weighting factors are 0.20 for the average idle mode and 0.08 for all other modes.

iii) Calculate the brake specific emissions for HC, CO, and NO as follows:

$$BSHC = \frac{\Sigma(HC_{mass} \times WF)}{\Sigma(BHP \times WF)}$$

$$BSCO = \frac{\Sigma(CO_{mass} \times WF)}{\Sigma(BHP \times WF)}$$

$$BSNO = \frac{\Sigma(NO_{mass} \times WF)}{\Sigma(BHP \times WF)}$$

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FIGURE 1

FUEL FLOW MEASUREMENT SYSTEM

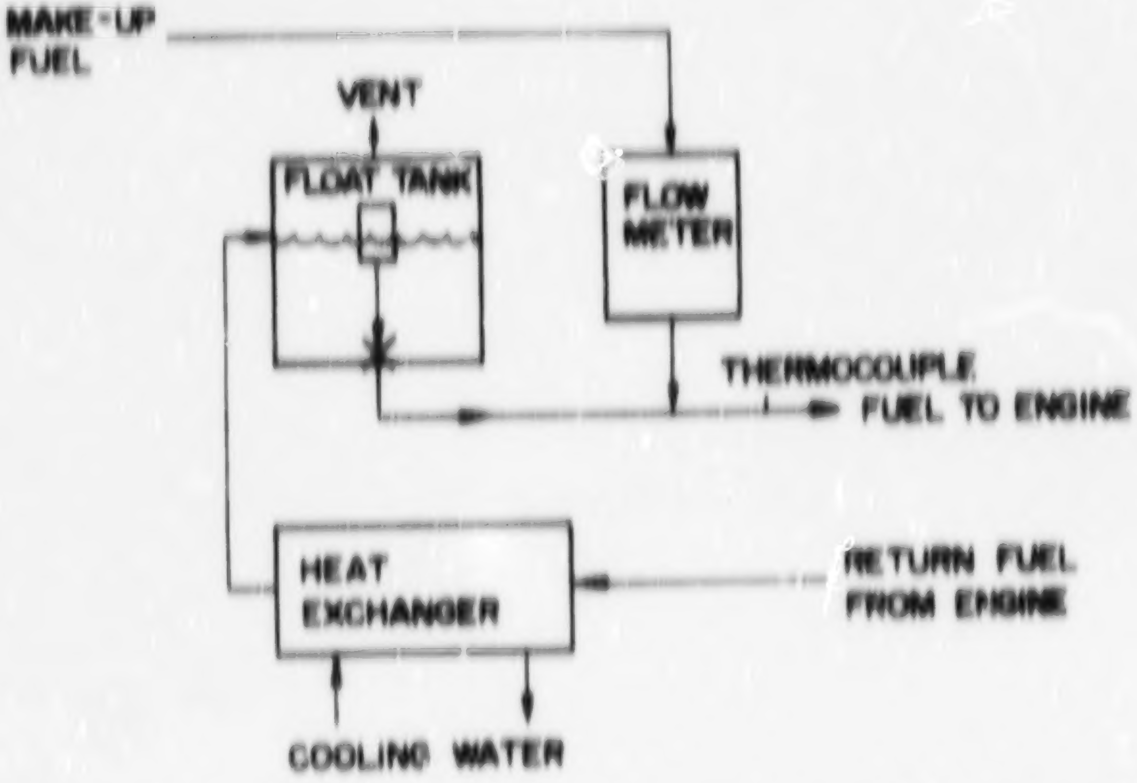

MAKE-UP FUEL
VENT
FLOAT TANK
FLOW METER
THERMOCOUPLE
FUEL TO ENGINE
HEAT EXCHANGER
RETURN FUEL FROM ENGINE
COOLING WATER

Figure 2

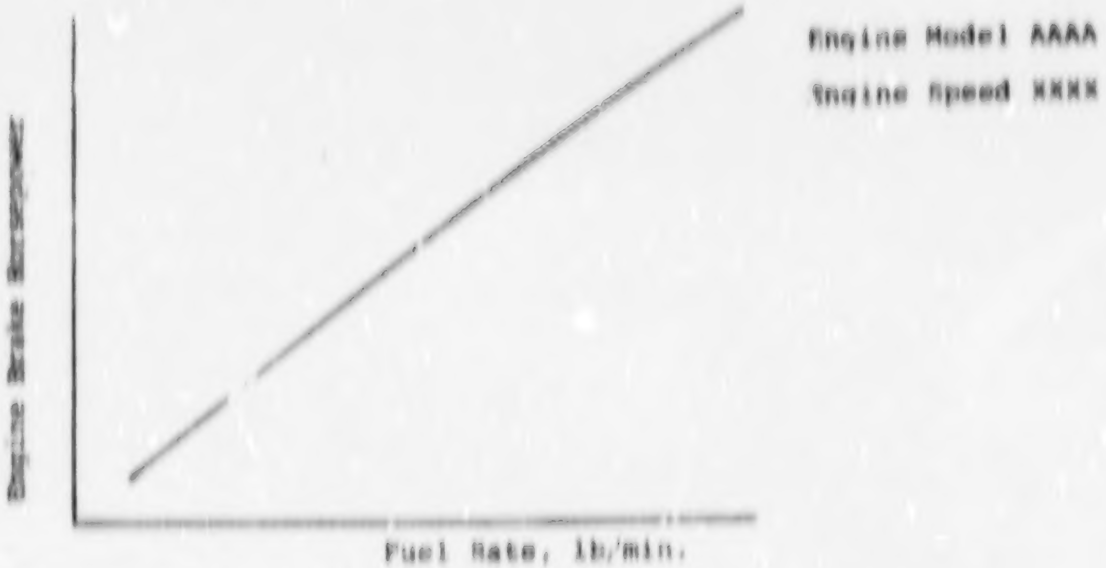
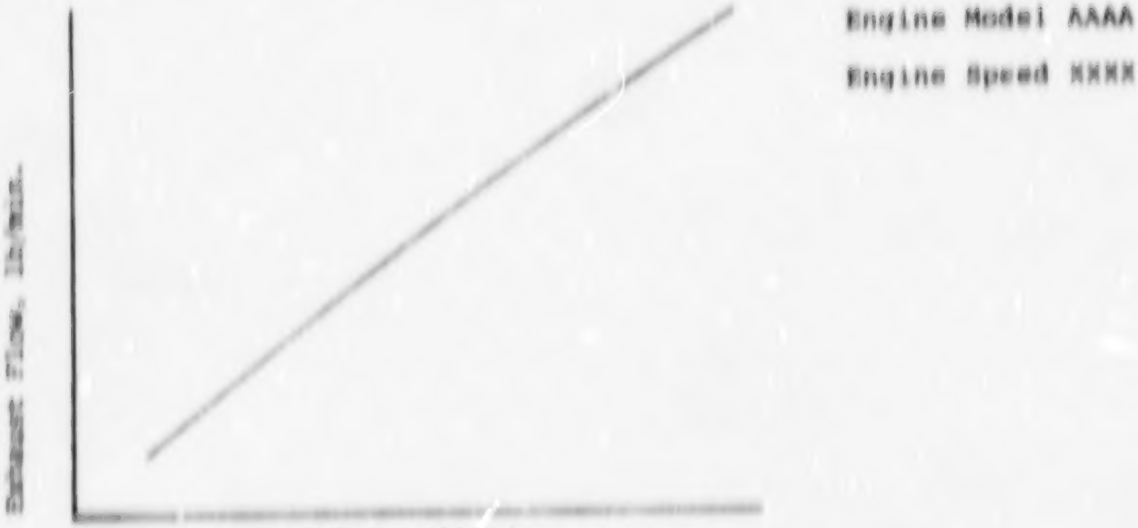


Figure 3



GMC COACHES SERVICE

Coach Service Information Bulletin

GMC TRUCK & COACH DIVISION GENERAL MOTORS CORPORATION

IMPORTANT—All Service Personnel Should Read and Initial

NUMBER: C-80-1-1
GROUP: 13-FUEL-7

DATE: January 15, 1980

File [illegible] Catalytic Muffler [illegible]

Subject: CATALYTIC MUFFLER
Models: TRANSIT AND SUBURBAN COACHES EQUIPPED WITH SUBJECT MUFFLER
Effective: SERVICE ONLY

The purpose of this Bulletin is to inform coach operators of the recommended maintenance program for the horizontal bed catalytic muffler.

INFORMATION

Some coaches are equipped with horizontal bed catalyst mufflers on special orders. These mufflers are available in two types, for use with 6V-71 or 8V-71 engines. The 6V type requires 38.5 pounds of catalyst pellets and the 8V requires 50 pounds. Pellets can be obtained through regular parts channels in 38.5 pound quantities.

INSTRUCTIONS

1. Exhaust back pressure is directly related to carbon build-up on the pellets and should be periodically checked at a point two inches upstream from the pipe flange in the manifold. Maximum allowable pressure is nine to ten inches of mercury at 2100 engine rpm. If the back pressure reaches the maximum, the catalyst pellets should be changed. The injector timing, air inlet restriction, fuel, compression pressure, condition of injectors, and engine tune-up in general should be checked if engine is smoking excessively.
2. Check the catalyst level every six (6) months or 20,000 miles, whichever occurs first. This can be done by removing the plug in the side of the muffler. If the level falls below the midline of the hole, additional catalyst pellets should be added to bring the level back to the midline.
3. Durability testing of the catalyst indicates that the level of the catalyst muffler effectiveness is continued at 40,000 miles but that there is sufficient deterioration in the catalyst activity to discontinue its use beyond this point as its effect is marginal. Catalyst contamination by carbon build-up on areas of the pellets will accelerate the deterioration and thus good engine maintenance is necessary to prolong the catalyst life. To change the pellets, it is necessary to remove the muffler from the coach. After removing the old pellets, a full charge (one 38.5 pound package for the 6V-71 application) can be poured into the muffler, and it can be reinstalled in the coach.

PARTS INFORMATION

Part No.	Description	Quantity
8994051	Catalyst	1 Pkg. (38.5 lbs.)

Pontiac, Michigan
9V-10-80

Printed in U.S.A.

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MEASUREMENT OF TRUCK AND BUS NOISE—SAE J672

SAE Standard

Report of Truck and Bus Technical Committee approved [illegible]

Introduction—This Standard sets forth the Equipment and Procedure to be used in measuring [illegible]

Equipment

1. A magnetic tape recorder of broadcast transcription or instrument quality.

2. A high quality microphone, possessing ruggedness and stability. [illegible]

3. A means for at least a single frequency overall acoustical calibration at the test site.

4. A set of octave bandpass filters meeting ASA requirements as set forth in Bulletin [illegible]

5. A decibel indicating meter which meets the requirements for an ASA Sound Level Meter [illegible]

Procedure

Environment—Ambient noise levels in each octave band [illegible]

[illegible]

Preliminary—[illegible]

Test Procedure—Place microphone [illegible] above ground, [illegible] to the

[illegible]

[illegible]

[illegible]

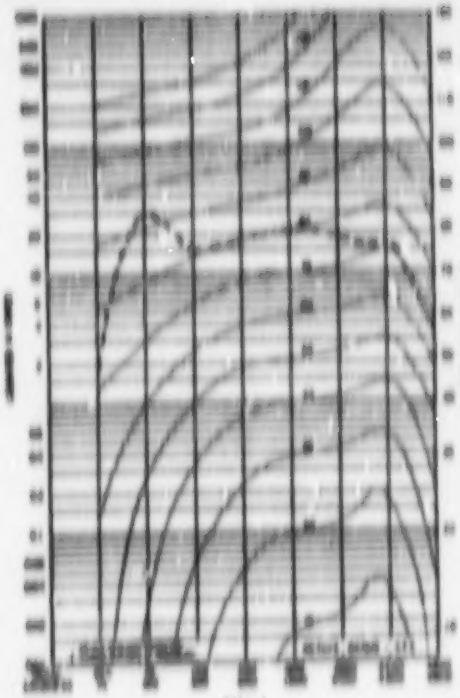

FIG. 1

[illegible]

REFERENCES

[illegible]

(Table 2 appears on next page)

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[illegible]

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APPENDIX B

ODOR PANEL DATA

TABLE B-1. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: September 28, 1970

Test Configuration: L8N Injectors, Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
4	24 mph	3.5	1.2	1.0	1.0	0.8
7	900 rpm	3.3	1.0	1.0	0.9	0.6
10	1/2 load*	3.3	1.0	0.9	0.9	0.6
15		2.8	0.9	0.8	0.7	0.3
	Average	3.3	1.0	0.9	0.9	0.5
3	32 mph	3.4	1.1	0.9	0.9	0.4
5	1200 rpm	3.2	0.9	0.9	0.7	0.8
11	1/2 load*	2.4	1.0	0.8	0.4	0.3
14		3.4	1.1	1.0	1.0	0.4
	Average	3.1	1.0	0.9	0.8	0.5
2	40 mph	4.0	1.1	1.0	0.9	1.0
8	1500 rpm	4.4	1.4	1.0	0.8	1.1
12	1/2 load*	4.1	1.3	1.0	0.9	0.9
16		3.7	1.2	1.0	0.8	0.8
	Average	4.1	1.3	1.0	0.9	1.0
1	Idle	4.1	1.2	1.0	1.0	0.5
6	Idle	4.9	1.7	1.0	0.9	1.0
9	Idle	4.6	1.4	1.0	1.0	0.9
13	Idle	4.9	1.6	1.1	1.0	1.1
	Average	4.6	1.5	1.0	1.0	1.0
17	Idle-Acceleration	4.6	1.3	1.0	1.0	1.0
20	Idle-Acceleration	4.1	1.4	1.0	0.9	0.9
23	Idle-Acceleration	4.0	1.1	1.0	1.0	1.0
24	Idle-Acceleration	3.3	1.0	1.0	0.8	0.7
	Average	4.0	1.2	1.0	0.9	0.9
18	Deceleration	4.8	1.7	1.0	1.0	1.0
19	Deceleration	4.3	1.2	1.0	1.1	1.0
21	Deceleration	4.6	1.6	1.0	0.9	1.0
22	Deceleration	4.6	1.6	1.0	1.0	1.0
	Average	4.5	1.5	1.5	1.0	1.0

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-2. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: September 29, 1970

Test Configuration: L8N Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2	24 mph	2.1	1.0	0.7	0.4	0.0
7	900 rpm	3.2	1.0	0.9	0.8	0.6
9	1/2 load*	2.6	0.7	1.0	0.7	0.2
14		1.7	0.6	0.6	0.5	0.0
	Average	2.4	0.8	0.8	0.6	0.2
3	32 mph	2.9	1.0	0.9	0.7	0.2
8	1200 rpm	1.9	0.8	0.6	0.5	0.0
10	1/2 load*	1.9	0.7	0.8	0.3	0.0
13		1.9	0.9	0.7	0.3	0.0
	Average	2.2	0.9	0.8	0.5	0.1
4	40 mph	2.9	1.0	1.0	0.7	0.2
5	1500 rpm	3.1	0.9	1.0	1.0	0.2
12	1/2 load*	2.7	1.0	0.9	0.5	0.3
15		2.3	0.8	0.5	0.8	0.2
	Average	2.8	0.9	0.9	0.8	0.2
1	Idle	4.4	1.2	1.0	1.0	1.0
6	Idle	4.8	1.6	1.0	1.0	1.0
11	Idle	4.6	1.5	1.0	1.0	1.0
16	Idle	4.4	1.3	1.0	1.0	1.0
	Average	4.6	1.4	1.0	1.0	1.0
19	Idle-Acceleration	4.7	1.7	1.0	1.1	0.9
20	Idle-Acceleration	3.8	1.1	0.9	1.0	0.7
21	Idle-Acceleration	4.2	1.3	1.0	1.0	0.9
23	Idle-Acceleration	5.0	1.8	1.1	1.0	1.0
	Average	4.4	1.5	1.0	1.0	0.9
17	Deceleration	5.3	1.8	1.1	1.0	1.1
18	Deceleration	5.1	2.0	1.0	1.1	1.0
22	Deceleration	5.6	2.0	1.3	1.2	1.0
24	Deceleration	5.2	2.0	1.0	1.1	1.0
	Average	5.3	2.0	1.1	1.1	1.0

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-3. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: October 1, 1970

Test Configuration: 608 Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	24 mph	2.3	1.0	0.2	1.0	0.1
7	900 rpm	3.0	1.0	0.7	1.0	0.3
9	1/2 load*	3.1	1.0	0.8	0.8	0.4
13		2.4	0.9	0.8	0.7	0.1
	Average	2.8	1.0	0.6	0.9	0.2
4	32 mph	3.8	1.0	1.0	1.0	0.7
5	1200 rpm	4.1	1.0	1.0	0.9	1.0
12	1/2 load*	3.4	1.0	1.0	0.9	0.6
14		2.1	0.9	0.7	0.6	0.1
	Average	3.4	1.0	0.9	0.9	0.6
2	40 mph	2.9	1.0	0.8	0.9	0.3
8	1500 rpm	3.8	1.1	1.0	1.0	0.7
10	1/2 load*	2.9	1.0	0.6	0.8	0.3
15		3.1	1.0	0.8	1.0	0.3
	Average	3.2	1.0	0.8	0.9	0.4
1	Idle	5.0	1.7	1.0	1.0	1.0
6	Idle	5.4	2.1	1.0	1.4	1.0
11	Idle	5.0	1.8	1.0	1.1	1.0
16	Idle	5.0	1.7	1.1	1.1	1.0
	Average	5.1	1.8	1.0	1.2	1.0
17	Idle-Acceleration	5.0	1.7	1.0	1.1	1.0
20	Idle-Acceleration	6.0	2.0	1.3	1.1	1.3
22	Idle-Acceleration	5.9	1.9	1.6	1.0	1.3
24	Idle-Acceleration	5.6	1.9	1.1	1.1	1.2
	Average	5.6	1.9	1.3	1.1	1.2
18	Deceleration	5.9	2.0	1.1	1.6	1.2
19	Deceleration	5.9	1.8	1.3	1.4	1.1
21	Deceleration	5.7	2.0	1.4	1.1	1.1
23	Deceleration	5.3	1.9	1.0	1.2	1.1
	Average	5.7	1.9	1.2	1.3	1.1

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-4. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: September 14, 1970

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	24 mph	2.5	1.0	0.6	0.8	0.0
7	900 rpm	2.8	1.0	0.9	0.8	0.3
9	1/2 load*	3.5	1.0	1.2	1.0	0.4
13		2.9	1.0	0.9	0.9	0.1
	Average	2.9	1.0	0.9	0.9	0.2
4	32 mph	2.8	1.0	0.9	0.9	0.0
5	1200 rpm	2.8	1.0	1.0	0.8	0.1
10	1/2 load*	2.3	0.6	0.8	0.9	0.3
14		1.5	0.4	0.9	0.4	0.1
	Average	2.4	0.8	0.9	0.8	0.1
2	40 mph	1.5	0.6	0.5	0.3	0.0
8	1500 rpm	4.0	1.2	1.0	0.9	0.6
12	1/2 load*	2.9	0.9	0.9	0.8	0.3
15		3.0	0.9	1.0	0.5	0.8
	Average	2.9	0.9	0.9	0.6	0.4
1	Idle	1.8	0.9	0.5	0.4	0.0
6	Idle	4.1	1.4	1.0	0.8	0.8
11	Idle	4.4	1.2	0.9	1.2	1.0
16	Idle	4.4	1.4	0.9	1.0	0.9
	Average	3.7	1.2	0.8	0.9	0.7
17	Idle-Acceleration	4.0	1.5	1.0	0.9	0.5
19	Idle-Acceleration	3.8	1.2	1.0	0.6	0.8
22	Idle-Acceleration	3.3	1.2	1.0	0.8	0.5
23	Idle-Acceleration	4.0	1.2	1.0	0.8	1.0
	Average	3.8	1.3	1.0	0.8	0.7
18	Deceleration	4.0	1.4	1.0	1.0	0.8
20	Deceleration	3.6	1.3	1.0	0.8	0.6
21	Deceleration	3.3	1.0	1.0	0.9	0.5
24	Deceleration	3.4	1.0	1.0	0.9	0.5
	Average	3.6	1.2	1.0	0.9	0.6

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-5. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: September 15, 1970

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	24 mph	2.3	0.8	0.4	0.9	0.2
5	900 rpm	2.9	1.0	0.7	1.0	0.2
11	1/2 load*	2.0	1.0	0.7	0.3	0.1
16		2.4	0.9	0.9	0.6	0.2
	Average	2.4	0.9	0.7	0.7	0.2
1	32 mph	2.4	0.8	0.7	0.7	0.0
6	1200 rpm	2.3	0.9	0.9	0.6	0.2
12	1/2 load*	2.1	0.8	0.6	0.7	0.1
13		1.9	0.8	0.7	0.4	0.1
	Average	2.2	0.8	0.7	0.6	0.1
4	40 mph	3.4	1.1	0.9	0.9	0.2
7	1500 rpm	3.1	0.9	0.9	1.0	0.3
9	1/2 load*	3.2	1.0	0.9	0.9	0.4
14		2.7	0.9	1.0	0.7	0.2
	Average	3.1	1.0	0.9	0.9	0.3
2	Idle	4.1	1.0	1.0	1.0	1.0
8	Idle	4.1	1.1	1.0	1.0	0.8
10	Idle	3.9	1.0	1.0	1.0	0.7
15	Idle	3.7	1.1	0.8	1.0	0.7
	Average	4.0	1.1	1.0	1.0	0.8
18	Idle-Acceleration	4.6	1.4	1.1	0.9	0.9
20	Idle-Acceleration	4.3	1.3	1.1	0.9	1.0
21	Idle-Acceleration	5.0	1.4	1.2	1.0	1.0
24	Idle-Acceleration	4.6	1.3	1.0	1.0	1.0
	Average	4.6	1.4	1.1	1.0	1.0
17	Deceleration	1.9	1.0	0.7	0.1	0.2
19	Deceleration	2.9	1.0	0.9	0.4	0.6
22	Deceleration	2.9	1.0	1.0	0.7	0.6
23	Deceleration	2.7	1.1	0.8	0.8	0.1
	Average	2.6	1.0	0.9	0.5	0.4

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-6. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: September 17, 1970

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	24 mph	5.3	1.6	1.4	1.1	0.7
5	900 rpm	4.8	1.4	1.1	1.0	0.9
11	1/2 load*	4.2	1.2	1.2	1.0	0.8
15		3.9	1.3	0.9	1.0	0.7
	Average	4.5	1.4	1.2	1.0	0.8
4	32 mph	4.5	1.4	1.3	1.0	0.6
8	1200 rpm	4.7	1.5	1.3	0.9	0.8
12	1/2 load*	3.8	1.1	1.0	1.0	0.6
13		3.6	1.2	1.1	1.0	0.5
	Average	4.1	1.3	1.2	1.0	0.6
2	40 mph	4.8	1.5	1.0	1.0	0.9
6	1500 rpm	4.1	1.2	1.0	1.0	0.8
9	1/2 load*	4.1	1.2	1.0	1.0	0.9
16		4.1	1.3	1.0	1.0	0.7
	Average	4.3	1.3	1.0	1.0	0.8
1	Idle	4.5	1.4	1.1	[illegible]	0.8
7	Idle	5.0	1.7	1.0	1.0	0.9
10	Idle	4.5	1.5	0.9	1.2	1.0
14	Idle	4.9	1.5	1.2	1.2	1.0
	Average	4.7	1.5	1.1	1.1	0.9
17	Idle-Acceleration	5.5	1.8	1.5	1.1	1.1
19	Idle-Acceleration	5.9	2.0	1.6	1.2	1.3
22	Idle-Acceleration	6.3	2.0	1.4	1.4	1.5
24	Idle-Acceleration	6.1	2.0	1.8	1.1	1.1
	Average	6.0	2.0	1.6	1.2	1.3
18	Deceleration	5.7	2.0	1.3	1.3	1.3
20	Deceleration	5.8	2.0	1.4	1.1	1.2
21	Deceleration	6.3	2.0	1.4	1.4	1.1
23	Deceleration	5.7	2.0	1.3	1.1	1.2
	Average	5.9	2.0	1.4	1.2	1.2

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-7. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: August 31, 1970

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
4	24 mph	1.9	0.8	0.7	0.5	0.1
6	900 rpm	2.5	0.8	1.0	0.9	0.0
12	1/2 load*	2.4	1.0	0.8	0.8	0.0
13		1.8	0.8	0.5	0.4	0.2
	Average	2.1	0.9	0.8	0.7	0.1
2	32 mph	3.2	1.0	0.5	1.0	0.3
5	1200 rpm	2.1	0.8	0.9	0.4	0.1
11	1/2 load*	2.2	0.8	0.8	0.6	0.0
15		2.5	1.0	0.9	0.6	0.1
	Average	2.5	0.9	0.8	0.7	0.1
3	40 mph	2.7	0.9	0.0	0.8	0.3
7	1500 rpm	3.2	1.0	0.8	0.9	0.6
9	1/2 load*	2.2	0.8	0.8	0.6	0.0
16		3.9	1.1	0.9	1.0	0.9
	Average	3.0	1.0	0.8	0.8	0.5
1	Idle	3.5	1.0	0.9	0.8	0.3
8	Idle	3.0	0.9	1.0	0.9	0.4
10	Idle	2.0	0.9	0.5	0.6	0.1
14	Idle	2.2	0.7	0.3	0.8	0.2
	Average	2.7	0.9	0.7	0.8	0.3
17	Idle-Acceleration	4.6	1.4	1.0	1.0	1.0
20	Idle-Acceleration	4.6	1.4	1.0	1.1	1.0
23	Idle-Acceleration	3.9	1.0	1.0	1.0	0.9
24	Idle-Acceleration	3.9	1.0	1.0	0.9	0.9
	Average	4.3	1.2	1.0	1.0	1.0
18	Deceleration	3.5	1.2	1.0	1.0	0.3
19	Deceleration	2.7	1.0	0.7	0.6	0.5
21	Deceleration	4.8	1.5	1.0	0.9	1.0
22	Deceleration	3.4	1.0	0.9	0.9	0.6
	Average	3.6	1.2	0.9	0.9	0.6

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-8. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: September 1, 1970

Test Configuration: L8N Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1	24 mph	4,1	1,1	1,0	0,8	0,9
7	900 rpm	2,5	1,0	0,6	0,7	0,2
11	1/2 load[a]	3,7	1,1	1,0	1,0	0,6
14		3,4	1,0	0,9	1,0	0,4
	Average	3,4	1,1	0,9	0,9	0,5
2	32 mph	3,3	1,0	1,0	1,0	0,4
8	1200 rpm	2,4	0,9	0,7	0,7	0,3
9	1/2 load[a]	3,3	1,0	0,9	0,8	0,4
15		3,3	1,0	0,9	0,9	0,4
	Average	3,1	1,0	0,9	0,9	0,4
3	40 mph	3,7	1,1	1,0	1,0	0,4
6	1500 rpm	4,5	1,3	1,0	0,8	0,9
12	1/2 load[a]	5,2	1,8	1,0	1,1	1,0
16		4,5	1,3	1,0	1,0	1,0
	Average	4,5	1,4	1,0	1,0	0,8
4	Idle	4,6	1,5	1,0	0,9	1,0
5	Idle	3,5	1,1	0,8	1,0	0,7
10	Idle	4,0	1,2	0,9	1,0	0,8
13	Idle	4,3	1,2	1,0	1,0	0,9
	Average	4,1	1,3	0,9	1,0	0,9
18	Idle-Acceleration	4,3	1,6	1,0	0,8	0,9
20	Idle-Acceleration	5,1	1,7	0,9	1,2	1,1
21	Idle-Acceleration	4,9	1,7	0,9	1,0	1,1
22	Idle-Acceleration	5,1	1,8	1,1	1,1	1,0
	Average	4,9	1,7	1,0	1,0	1,0
17	Deceleration	3,3	1,3	0,7	0,8	0,7
19	Deceleration	3,7	1,1	0,9	1,0	0,7
23	Deceleration	2,6	0,9	0,7	0,8	0,3
24	Deceleration	2,8	1,0	0,9	0,8	0,1
	Average	3,1	1,1	0,8	0,9	0,5

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[a] Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-9. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: September 3, 1970

Test Configuration: 608 Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2	24 mph	3.0	0.9	1.0	0.6	0.2
5	900 rpm	3.6	1.0	1.0	0.8	0.5
11	1/2 load*	4.4	1.1	1.0	0.9	0.6
14		5.5	1.4	1.2	0.9	1.0
	Average	4.1	1.1	1.1	0.8	0.6
1	32 mph	4.2	1.0	1.0	0.9	0.5
7	1200 rpm	4.7	1.2	1.1	0.9	0.6
12	1/2 load*	4.6	1.4	0.9	0.8	0.7
13		4.4	1.0	0.9	1.0	0.9
	Average	4.5	1.2	1.0	0.9	0.7
4	40 mph	6.0	1.9	1.2	1.0	1.0
8	1500 rpm	5.3	1.6	0.9	1.0	0.9
10	1/2 load*	5.5	1.6	1.1	0.9	0.9
15		5.4	1.6	1.0	0.8	1.0
	Average	5.6	1.7	1.0	0.9	1.0
3	Idle	5.6	1.7	1.0	1.0	1.0
6	Idle	5.3	1.7	1.0	1.0	0.8
9	Idle	5.1	1.6	1.0	1.0	0.7
16	Idle	6.6	1.9	1.4	1.1	1.2
	Average	5.7	1.7	1.1	1.0	0.9
17	Idle-Acceleration	6.8	1.8	1.3	0.9	1.7
20	Idle-Acceleration	6.1	1.8	1.1	0.8	1.4
22	Idle-Acceleration	7.4	2.0	1.6	1.1	1.7
23	Idle-Acceleration	6.9	2.0	1.2	1.2	1.5
	Average	6.8	1.9	1.3	1.0	1.6
18	Deceleration	7.6	2.0	1.3	1.3	1.9
19	Deceleration	6.8	2.0	1.3	1.3	1.4
21	Deceleration	6.8	2.1	1.1	1.2	1.5
24	Deceleration	7.8	2.0	1.4	1.5	1.9
	Average	7.3	2.0	1.3	1.3	1.7

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-10. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: April 27, 1971

Test Configuration: L8N Injectors, Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2	25 mph	2.0	0.9	0.5	0.5	0.0
7	900 rpm	2.1	0.8	0.6	0.6	0.3
10	1/2 load*	2.9	1.0	0.8	0.9	0.8
13		3.0	0.9	1.0	0.9	0.3
	Average	2.5	0.9	0.8	0.7	0.4
4	30 mph	1.6	0.9	0.6	0.1	0.1
8	1200 rpm	2.3	1.0	0.6	0.6	0.3
11	1/2 load*	3.8	1.0	1.0	0.9	0.9
16		3.0	1.0	1.0	0.6	0.5
	Average	2.7	1.0	0.8	0.5	0.5
3	36 mph	2.0	0.9	0.6	0.3	0.3
5	1500 rpm	3.0	1.0	0.6	0.6	0.8
12	1/2 load*	3.9	1.3	1.0	0.9	0.9
15		2.9	1.0	1.0	0.5	0.5
	Average	3.0	1.1	0.8	0.6	0.6
1	Idle	2.6	0.8	0.8	0.9	0.0
6	Idle	2.9	0.9	0.8	0.8	0.1
9	Idle	3.9	1.2	1.0	0.8	1.0
14	Idle	3.6	1.0	1.0	0.9	0.8
	Average	3.2	1.0	0.9	0.9	0.5
18	Idle-Acceleration	3.9	1.2	1.0	1.0	0.9
20	Idle-Acceleration	3.5	1.0	0.9	0.9	0.8
22	Idle-Acceleration	4.3	1.5	1.0	1.0	0.8
24	Idle-Acceleration	3.6	1.3	1.0	0.9	0.8
	Average	3.8	1.3	1.0	1.0	0.8
17	Deceleration	2.8	1.0	0.9	0.5	0.4
19	Deceleration	3.6	1.0	1.0	1.0	0.8
21	Deceleration	4.3	1.6	1.0	0.9	0.6
23	Deceleration	3.9	1.0	1.0	1.0	0.8
	Average	3.7	1.2	1.0	0.9	0.7

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-11. VEHICLE ODOR EVALUATION SUMMARY

Vehicle:	Bus 702	Test Configuration:	L8N Injectors, Stock Muffler
Date:	April 28, 1971	Fuel:	EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	23 mph	2.0	0.6	0.9	0.6	0.1
7	900 rpm	3.4	0.9	1.0	1.0	0.6
12	1/2 load*	2.3	0.7	0.6	0.9	0.3
14		3.1	1.0	0.9	0.9	0.6
	Average	2.7	0.8	0.9	0.9	0.4
4	30 mph	2.1	0.9	0.7	0.4	0.1
5	1400 rpm	2.4	0.7	0.7	0.7	0.4
11	1/2 load*	2.4	0.6	0.9	0.9	0.3
15		2.6	1.0	0.9	0.7	0.3
	Average	2.4	0.8	0.8	0.7	0.3
2	36 mph	2.9	1.0	1.0	0.7	0.1
8	1500 rpm	3.7	1.1	1.0	1.0	0.7
10	1/2 load*	2.4	1.0	1.0	1.0	0.4
16		3.4	1.0	1.0	0.9	0.7
	Average	3.1	1.0	1.0	0.9	0.5
1	Idle	2.4	1.0	0.9	0.4	0.1
6	Idle	3.7	1.0	1.0	1.0	0.7
9	Idle	3.7	1.0	1.0	1.0	0.6
13	Idle	3.4	0.9	1.0	0.7	0.6
	Average	3.3	1.0	1.0	0.8	0.5
18	Idle-Acceleration	5.0	1.9	1.1	1.0	0.9
20	Idle-Acceleration	5.4	1.9	1.4	1.0	1.3
23	Idle-Acceleration	4.6	1.6	1.0	1.0	1.0
24	Idle-Acceleration	4.7	1.6	1.0	1.0	1.1
	Average	4.9	1.8	1.1	1.0	1.1
17	Deceleration	4.7	1.6	1.0	1.0	1.0
19	Deceleration	4.4	1.1	1.1	1.0	1.0
21	Deceleration	4.4	1.1	1.1	1.0	1.0
22	Deceleration	4.3	1.1	1.0	1.0	1.0
	Average	4.5	1.2	1.1	1.0	1.0

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-12. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: April 30, 1971

Test Configuration: 60S Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	25 mph	5,8	1,9	1,8	0,9	1,2
8	900 rpm	5,0	1,5	1,2	1,0	1,0
11	1/2 load*	4,5	1,3	1,0	1,0	1,0
15		4,5	1,5	1,0	1,0	1,0
	Average	5,0	1,6	1,3	1,0	1,1
4	30 mph	4,6	1,4	1,3	0,9	1,0
6	1200 rpm	5,1	1,5	1,4	1,0	1,0
12	1/2 load*	4,5	1,3	1,0	1,0	1,0
16		4,4	1,2	1,0	1,0	1,0
	Average	4,6	1,4	1,2	1,0	1,0
1	35 mph	4,9	1,5	1,3	1,0	1,0
7	1500 rpm	4,1	1,0	1,2	1,0	1,0
10	1/2 load*	5,3	1,8	1,2	1,0	1,0
13		4,6	1,6	1,0	1,0	1,0
	Average	4,7	1,5	1,2	1,0	1,0
2	Idle	4,6	1,4	1,0	0,9	1,0
5	Idle	4,5	1,4	1,2	1,0	1,0
9	Idle	4,3	1,0	1,0	1,0	1,0
14	Idle	5,1	1,9	1,0	1,0	1,0
	Average	4,6	1,4	1,1	1,0	1,0
17	Idle-Acceleration	6,6	2,0	1,5	1,0	1,9
20	Idle-Acceleration	7,3	2,1	2,0	1,2	1,9
21	Idle-Acceleration	7,5	2,3	1,9	1,2	2,0
23	Idle-Acceleration	6,8	2,1	1,5	0,9	1,9
	Average	7,1	2,1	1,7	1,1	1,9
18	Deceleration	6,4	2,0	1,5	1,3	1,6
19	Deceleration	6,1	2,0	1,3	1,3	1,6
22	Deceleration	6,3	2,0	1,6	1,2	1,5
24	Deceleration	6,8	2,1	1,5	0,9	1,9
	Average	6,4	2,0	1,5	1,2	1,7

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-13. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: April 13, 1971

Test Configuration: LBN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	25 mph	3.4	1.2	1.0	0.7	0.6
5	900 rpm	2.6	0.8	1.0	0.4	0.3
10	1/2 load*	2.0	0.9	0.8	0.6	0.0
13		2.8	0.9	1.0	0.8	0.2
	Average	2.7	1.0	1.0	0.6	0.3
1	30 mph	2.3	1.0	0.9	0.2	0.1
8	1200 rpm	2.6	0.9	0.7	0.8	0.2
9	1/2 load*	4.6	1.6	1.2	1.0	0.9
16		2.8	0.9	1.0	0.8	0.3
	Average	3.1	1.1	1.0	0.7	0.4
4	37 mph	4.6	1.6	1.1	0.8	0.9
6	1500 rpm	3.6	1.0	1.0	0.5	0.7
11	1/2 load*	4.1	1.2	1.0	1.0	0.8
15		4.0	1.3	1.0	1.0	0.8
	Average	4.1	1.3	1.0	0.9	0.8
2	Idle	3.0	0.9	1.0	0.9	0.3
7	Idle	3.2	1.1	0.9	0.7	0.6
12	Idle	3.0	0.9	0.9	0.6	0.4
14	Idle	3.3	1.0	1.0	0.7	0.6
	Average	3.1	1.0	1.0	0.8	0.5
17	Idle-Acceleration	4.0	1.3	1.0	1.0	0.7
19	Idle-Acceleration	4.9	2.0	1.2	1.0	1.0
22	Idle-Acceleration	4.9	1.8	1.1	1.0	1.0
23	Idle-Acceleration	5.0	1.8	1.3	1.0	1.0
	Average	4.7	1.7	1.2	1.0	0.9
18	Deceleration	2.7	1.1	1.0	0.3	0.1
20	Deceleration	3.1	1.1	0.9	0.8	0.3
21	Deceleration	2.9	1.0	1.0	0.3	0.6
24	Deceleration	3.1	1.0	1.0	0.7	0.3
		3.0	1.1	1.0	0.5	0.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-14. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 70C
Date: April 14, 1971

Test Configuration: L8N Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
4	23 mph	2.7	0.9	1.0	0.7	0.2
7	900 rpm	3.2	1.0	1.0	0.8	0.3
11	1/2 load*	2.4	1.0	0.9	0.5	0.0
13		2.5	0.9	0.9	0.6	0.2
	Average	2.7	1.0	1.0	0.7	0.2
3	30 mph	2.5	0.9	0.9	0.5	0.2
5	1200 rpm	2.5	0.9	0.9	0.3	0.3
10	1/2 load*	4.6	1.4	1.0	1.0	1.0
15		3.7	1.0	1.0	1.0	0.6
	Average	3.3	1.1	1.0	0.7	0.5
2	37 mph	3.6	1.0	1.0	0.9	0.6
8	1500 rpm	3.3	1.1	1.0	0.8	0.3
12	1/2 load*	3.5	1.1	0.9	1.0	0.5
16		3.1	1.0	1.0	0.6	0.5
	Average	3.4	1.1	1.0	0.8	0.5
1	Idle	3.5	1.0	0.9	0.6	0.9
6	Idle	3.6	1.0	0.8	1.0	0.9
9	Idle	4.0	1.1	1.0	1.0	0.8
14	Idle	4.1	1.2	1.0	0.9	0.9
		3.8	1.1	0.9	0.9	0.9
17	Idle-Acceleration	4.8	1.8	1.1	1.0	0.8
18	Idle-Acceleration	5.0	1.8	1.0	1.2	0.9
23	Idle-Acceleration	3.8	1.0	1.0	0.8	1.0
24	Idle-Acceleration	3.9	1.1	1.0	0.9	0.8
	Average	4.4	1.4	1.0	1.0	0.9
19	Deceleration	3.2	1.0	1.0	0.8	0.3
20	Deceleration	3.1	1.0	1.0	0.9	0.3
21	Deceleration	2.2	0.9	0.9	0.4	0.0
22	Deceleration	2.7	1.0	0.9	0.4	0.3
	Average	2.8	1.0	1.0	0.6	0.2

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-15. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: April 16, 1971

Test Configuration: 60S Injector,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2	23 mph	5.0	1.5	1.1	1.0	1.0
7	900 rpm	3.6	1.0	1.0	0.9	0.4
11	1/2 load*	4.8	1.8	1.1	1.0	0.9
16		4.3	1.1	1.2	1.0	1.0
	Average	4.4	1.4	1.1	1.0	0.8
3	30 mph	4.8	1.7	1.1	1.0	1.0
8	1200 rpm	4.1	1.1	1.0	1.0	1.0
10	1/2 load*	5.6	1.6	1.1	1.0	0.9
14		4.4	1.7	1.0	1.0	0.8
	Average	4.7	1.5	1.1	1.0	0.9
4	37 mph	4.1	1.1	1.0	1.0	1.0
5	1500 rpm	4.0	1.1	1.0	1.0	0.9
12	1/2 load*	4.1	1.3	1.0	1.0	0.8
15		3.8	1.1	1.1	0.8	0.8
	Average	4.0	1.2	1.0	1.0	0.9
1	Idle	4.1	1.0	1.0	1.0	0.9
6	Idle	3.4	1.1	0.9	0.9	0.4
9	Idle	3.2	1.0	1.0	0.9	0.7
13	Idle	5.0	1.7	1.2	0.9	1.1
	Average	3.9	1.2	1.0	0.9	0.8
18	Idle-Acceleration	6.6	2.0	1.8	1.1	1.8
19	Idle-Acceleration	5.9	2.0	1.6	1.0	1.2
23	Idle-Acceleration	6.9	2.2	1.8	1.3	1.7
24	Idle-Acceleration	6.1	2.1	1.7	1.1	1.1
	Average	6.4	2.1	1.7	1.1	1.5
17	Deceleration	5.8	1.9	1.7	1.1	1.1
20	Deceleration	6.0	2.0	1.3	1.2	1.6
21	Deceleration	6.0	2.1	1.6	1.1	1.3
22	Deceleration	5.6	2.0	1.1	1.2	1.3
	Average	5.9	2.0	1.4	1.2	1.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-16. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: March 30, 1971

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2	23 mph	3.8	1.0	1.0	0.9	0.8
5	900 rpm	2.7	1.1	0.9	0.6	0.1
11	1/2 load*	2.3	0.8	1.0	0.5	0.1
14		2.9	1.0	1.0	0.7	0.3
	Average	2.9	1.0	1.0	0.7	0.3
1	30 mph	3.6	1.1	1.0	0.7	0.8
7	1200 rpm	4.3	1.3	1.0	0.9	0.9
12	1/2 load*	2.6	0.9	1.0	0.6	0.4
13		3.0	0.9	1.0	0.5	0.5
	Average	3.4	1.1	1.0	0.7	0.7
3	38 mph	4.1	1.2	1.0	1.0	0.9
8	1500 rpm	4.1	1.3	1.0	1.0	0.8
10	1/2 load*	4.9	1.7	0.9	1.0	0.9
15		3.4	1.1	1.0	0.7	0.6
	Average	4.1	1.3	1.0	0.9	0.8
4	Idle	3.2	1.0	1.0	0.8	0.5
6	Idle	3.1	1.0	0.9	0.6	0.6
9	Idle	3.9	1.1	1.0	0.8	0.8
16	Idle	2.8	1.0	0.8	0.8	0.3
	Average	3.3	1.0	0.9	0.8	0.6
17	Idle-Acceleration	4.6	1.5	1.0	1.0	0.9
20	Idle-Acceleration	4.5	1.4	1.0	1.0	1.1
22	Idle-Acceleration	4.3	1.3	1.0	0.9	0.7
23	Idle-Acceleration	4.0	1.3	1.0	0.9	0.7
	Average	4.4	1.4	1.0	1.0	0.9
18	Deceleration	1.3	0.8	0.4	0.3	0.1
19	Deceleration	2.0	0.9	0.6	0.4	0.0
21	Deceleration	2.7	1.0	0.8	0.9	0.2
24	Deceleration	3.1	1.0	1.0	0.8	0.2
	Average	2.3	0.9	0.7	0.6	0.1

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-17. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: March 31, 1971

Test Configuration: LSN Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3	23 mph	3.0	1.0	0.8	1.2	0.3
5	900 rpm	3.4	1.1	1.0	1.0	0.4
11	1/2 load[a]	2.2	0.8	0.7	0.6	0.0
15		2.4	0.9	0.6	0.5	0.2
	Average	2.7	1.0	0.8	0.8	0.2
2	30 mph	3.9	1.0	1.0	1.0	0.9
8	1200 rpm	3.4	1.1	0.9	0.8	0.7
9	1/2 load[a]	4.1	1.1	1.0	1.0	0.8
16		3.3	1.0	1.0	1.0	0.3
	Average	3.7	1.1	1.0	1.0	0.7
4	38 mph	4.4	1.4	1.0	1.0	0.8
7	1500 rpm	4.5	1.4	1.0	1.0	0.9
10	1/2 load[a]	3.9	0.9	1.0	1.0	0.6
14		4.6	1.5	1.0	1.0	0.8
	Average	4.3	1.3	1.0	1.0	0.8
1	Idle	3.0	1.0	1.0	0.8	0.4
6	Idle	3.8	1.1	1.0	1.0	0.6
12	Idle	2.6	0.8	0.9	0.6	0.3
13	Idle	3.1	0.9	0.9	0.9	0.3
	Average	3.1	1.0	1.0	0.8	0.4
17	Idle-Acceleration	3.8	1.5	0.6	0.8	0.7
20	Idle-Acceleration	4.8	1.8	0.9	0.9	0.9
22	Idle-Acceleration	4.9	1.6	1.1	1.0	1.2
24	Idle-Acceleration	4.9	1.8	1.1	1.0	1.0
	Average	4.6	1.7	0.9	0.9	1.0
18	Deceleration	3.1	1.0	0.8	0.9	0.5
19	Deceleration	2.0	0.7	0.6	0.7	0.1
21	Deceleration	3.1	0.9	0.9	0.7	0.4
23	Deceleration	3.8	1.0	0.8	0.6	0.4
	Average	3.0	0.9	0.8	0.7	0.4

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[a] Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-18. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: April 7, 1971

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2	25 mph	5.6	1.9	1.7	0.9	1.1
5	900 rpm	5.0	1.7	1.2	1.0	1.0
12	1/2 load*	4.3	1.4	1.1	0.9	0.9
13		4.0	1.1	1.0	1.0	0.9
	Average	4.7	1.5	1.3	1.0	1.0
3	30 mph	5.6	1.9	1.4	1.3	1.0
8	1200 rpm	4.4	1.4	1.1	0.9	1.0
10	1/2 load*	4.7	1.7	1.1	1.0	0.9
15		4.9	1.8	1.0	1.0	1.0
	Average	4.9	1.7	1.2	1.1	1.0
4	37 mph	5.6	1.9	1.4	1.0	1.1
7	1500 rpm	5.3	1.9	1.4	0.9	1.0
11	1/2 load*	4.2	1.2	1.0	1.0	0.9
16		4.4	1.4	0.9	1.0	1.0
	Average	4.9	1.6	1.1	1.0	1.0
1	Idle	4.0	1.2	1.1	1.0	0.7
6	Idle	4.3	1.2	0.9	1.0	1.1
9	Idle	3.9	1.0	1.0	1.0	0.8
14	Idle	4.2	1.2	1.0	1.0	1.0
	Average	4.1	1.2	1.0	1.0	0.9
17	Idle-Acceleration	5.7	2.0	1.4	0.9	1.3
20	Idle-Acceleration	5.7	2.0	1.6	1.0	1.4
22	Idle-Acceleration	5.2	1.8	1.2	1.0	1.0
23	Idle-Acceleration	5.2	1.8	1.1	1.0	1.1
	Average	5.5	1.9	1.3	1.0	1.2
18	Deceleration	5.9	2.0	1.6	0.9	1.4
19	Deceleration	5.2	1.9	1.1	1.1	1.2
21	Deceleration	5.3	2.0	1.3	1.1	1.0
24	Deceleration	5.8	1.9	1.2	1.2	1.6
	Average	5.6	2.0	1.3	1.1	1.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-19. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: August 17, 1971

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	2.1	0.9	0.9	0.5	0.1
5.	24 mph	2.8	0.8	1.0	0.6	0.4
12.	1/2 load*	2.1	0.8	0.8	0.6	0.1
15.		2.4	0.9	0.9	0.5	0.3
	Average	2.4	0.9	0.9	0.6	0.2
2.	1200 rpm	3.3	1.1	1.0	0.5	0.5
8.	32 mph	3.4	1.0	1.0	0.9	0.4
11.	1/2 load	2.3	1.0	1.0	0.4	0
16.		2.0	0.9	0.5	0.4	0.1
	Average	2.8	1.0	0.9	0.6	0.3
1.	1500 rpm	3.1	1.0	1.0	0.8	0.4
7.	40 mph	2.6	0.9	0.9	0.9	0.3
9.	1/2 load	3.9	1.1	1.0	0.9	0.8
14.		2.5	0.9	0.9	0.5	0.3
	Average	3.0	1.0	1.0	0.8	0.5
4.	Idle	2.5	1.0	0.5	0.9	0.3
6.	Idle	2.8	1.0	1.0	0.4	0.5
10.	Idle	2.6	0.9	0.9	0.6	0.4
13.	Idle	3.4	1.0	1.0	0.8	0.5
	Average	2.8	1.0	0.9	0.7	0.4
17.	Idle-Acceleration	4.0	1.1	1.0	1.0	0.9
19.	Idle-Acceleration	2.9	1.0	0.9	0.8	0.1
21.	Idle-Acceleration	3.8	1.3	1.0	1.0	0.5
23.	Idle-Acceleration	3.1	1.1	1.0	0.6	0.4
	Average	3.5	1.1	1.0	0.9	0.5
18.	Deceleration	3.9	1.0	1.0	1.0	1.0
20.	Deceleration	3.8	1.0	0.9	1.0	0.6
22.	Deceleration	3.3	1.1	1.0	0.9	0.3
24.	Deceleration	3.9	1.0	1.0	1.0	0.9
	Average	3.7	1.0	1.0	1.0	0.7

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

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TABLE B-20. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: August 18, 1971

Test Configuration: L8N Injectors,
Stock Mufflers
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	2.5	1.0	0.5	0.4	0.3
7.	24 mph	2.6	1.0	0.8	0.9	0.1
12.	1/2 load*	2.1	1.0	0.4	0.8	0
13.		2.6	1.0	0.9	0.4	0.4
	Average	2.5	1.0	0.6	0.6	0.2
4.	1200 rpm	2.6	1.0	1.0	0.4	0.4
6.	32 mph	2.8	1.0	0.9	0.6	0.3
9.	1/2 load	3.1	1.0	1.0	0.8	0.4
14.		1.9	0.9	0.3	0.4	0.4
	Average	2.6	1.0	0.8	0.6	0.4
1.	1500 rpm	3.3	0.9	1.0	0.8	0.6
8.	40 mph	3.5	1.1	1.0	1.0	0.4
10.	1/2 load	2.9	1.0	0.9	0.9	0.3
16.		3.4	1.0	1.0	0.9	0.6
	Average	3.3	1.0	1.0	0.9	0.5
2.	Idle	3.0	1.0	0.9	0.9	0.3
5.	Idle	3.4	1.0	0.9	0.8	0.8
11.	Idle	4.0	1.0	1.0	0.9	1.0
15.	Idle	3.1	1.0	0.9	1.0	0.3
	Average	3.4	1.0	0.9	0.9	0.6
19.	Idle-Acceleration	4.1	1.5	1.0	0.9	0.8
20.	Idle-Acceleration	3.5	1.0	1.0	0.9	0.6
21.	Idle-Acceleration	3.6	1.0	0.9	1.0	0.9
22.	Idle-Acceleration	3.6	1.1	1.0	1.0	0.8
	Average	3.7	1.2	1.0	1.0	0.8
17.	Deceleration	4.0	1.1	1.0	0.8	1.0
18.	Deceleration	3.5	1.0	1.0	1.0	0.4
23.	Deceleration	2.9	1.0	0.6	0.8	0.5
24.	Deceleration	2.9	0.9	1.0	0.8	0.4
	Average	3.3	1.0	0.9	0.9	0.6

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-21. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: August 20, 1971

Test Configuration: 50S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	4, 7	1, 6	1, 1	1, 0	1, 0
8.	24 mph	4, 3	1, 1	1, 0	1, 0	1, 0
11.	1/2 load*	3, 9	1, 1	1, 0	1, 0	0, 7
15.		3, 9	1, 3	1, 0	0, 9	0, 7
	Average	4, 2	1, 3	1, 0	1, 0	0, 9
4.	1200 rpm	4, 1	1, 1	1, 0	1, 0	0, 9
6.	32 mph	4, 6	1, 3	1, 0	1, 0	0, 9
12.	1/2 load	3, 3	1, 0	1, 0	0, 7	0, 4
14.		5, 1	1, 6	1, 0	1, 0	1, 0
	Average	4, 3	1, 3	1, 0	0, 9	0, 8
1.	1500 rpm	3, 6	0, 9	1, 0	1, 0	0, 4
7.	40 mph	4, 6	1, 3	1, 0	1, 0	0, 9
9.	1/2 load	3, 9	1, 1	1, 0	0, 9	0, 9
16.		3, 9	1, 0	1, 0	0, 7	0, 9
	Average	4, 0	1, 1	1, 0	0, 9	0, 8
2.	Idle	4, 0	1, 0	1, 0	1, 0	0, 9
5.	Idle	4, 4	1, 3	1, 0	1, 0	1, 0
10.	Idle	3, 9	1, 1	1, 0	0, 9	0, 7
13.	Idle	3, 7	1, 1	0, 9	1, 0	0, 7
	Average	4, 0	1, 1	1, 0	1, 0	0, 8
18.	Idle-Acceleration	6, 0	2, 0	1, 4	1, 0	1, 3
19.	Idle-Acceleration	5, 3	1, 9	1, 0	1, 0	1, 1
23.	Idle-Acceleration	5, 9	2, 0	1, 6	0, 9	1, 4
24.	Idle-Acceleration	5, 6	1, 9	1, 1	1, 0	1, 1
	Average	5, 7	2, 0	1, 3	1, 0	1, 2
17.	Deceleration	4, 9	1, 7	1, 1	1, 0	0, 7
20.	Deceleration	4, 9	1, 6	1, 1	1, 0	1, 0
21.	Deceleration	5, 0	1, 6	1, 1	1, 0	1, 0
22.	Deceleration	5, 0	1, 9	1, 0	1, 0	1, 0
	Average	5, 0	1, 7	1, 1	1, 0	0, 9

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-22. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: July 27, 1971

Test Configuration: L8N Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 2 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	3.3	1.1	0.9	0.6	0.7
5.	24 mph	3.1	1.1	0.9	0.7	0.6
10.	1/2 load*	2.7	1.0	0.9	0.7	0.2
13.		2.4	0.9	0.9	0.5	0.2
	Average	2.9	1.0	0.9	0.6	0.4
1.	1200 rpm	2.3	1.0	0.7	0.4	0.1
8.	32 mph	3.6	1.2	0.9	0.7	0.7
9.	1/2 load	4.7	1.5	1.1	0.9	0.9
16.		2.2	0.9	0.8	0.4	0.2
	Average	3.2	1.2	0.9	0.6	0.5
4.	1500 rpm	4.4	1.4	1.0	0.9	1.0
6.	40 mph	3.1	1.1	0.8	0.7	0.4
11.	1/2 load	4.3	1.2	1.0	1.0	0.8
15.		4.1	1.2	1.2	0.8	0.8
	Average	4.0	1.2	1.0	0.9	0.8
2.	Idle	3.6	1.0	0.9	0.7	0.6
7.	Idle	4.0	1.2	1.1	0.8	0.7
12.	Idle	3.9	1.1	1.0	1.0	0.7
14.	Idle	3.3	1.2	0.9	0.6	0.7
	Average	3.7	1.1	1.0	0.8	0.7
17.	Idle-Acceleration	4.6	1.3	1.1	0.9	0.9
19.	Idle-Acceleration	3.7	1.1	1.0	0.2	0.7
22.	Idle-Acceleration	4.2	1.2	1.0	1.0	0.8
23.	Idle-Acceleration	4.1	1.2	1.1	1.0	0.8
	Average	4.2	1.2	1.1	0.8	0.8
18.	Deceleration	3.6	1.0	1.0	0.3	0.8
20.	Deceleration	2.9	1.0	0.7	0.7	0.3
21.	Deceleration	2.7	1.0	0.9	0.4	0.4
24.	Deceleration	3.5	1.0	1.0	0.9	0.4
	Average	3.2	1.0	0.9	0.6	0.5

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-23. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: July 28, 1971

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-155-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	4.0	1.2	1.0	0.8	0.8
7.	24 mph	2.6	1.0	1.0	0.6	0
9.	1/2 load*	3.6	1.0	1.0	0.7	0.7
15.		3.2	1.0	1.0	0.7	0.4
	Average	3.4	1.1	1.0	0.7	0.5
4.	1200 rpm	3.2	1.0	1.0	0.7	0.6
8.	32 mph	3.3	0.9	1.0	0.5	0.4
11.	1/2 load	3.1	0.9	1.0	0.6	0.4
14.		3.0	1.1	0.9	0.7	0.3
	Average	3.2	1.0	1.0	0.6	0.4
1.	1500 rpm	2.9	0.9	1.0	0.8	0.3
6.	40 mph	3.4	1.1	1.0	0.7	0.7
12.	1/2 load	3.4	1.1	1.0	0.6	0.7
16.		2.6	1.0	0.4	0.7	0.2
	Average	3.1	1.0	0.9	0.7	0.5
2.	Idle	4.4	1.1	0.9	1.0	1.0
5.	Idle	4.4	1.3	1.1	0.9	0.8
10.	Idle	4.1	1.3	1.1	1.0	0.8
13.	Idle	4.6	1.6	1.2	1.0	0.9
	Average	4.4	1.3	1.1	1.0	0.9
18.	Idle-Acceleration	5.2	1.9	1.3	1.0	0.9
19.	Idle-Acceleration	4.6	1.2	1.1	1.0	1.0
22.	Idle-Acceleration	4.6	1.3	1.2	1.0	0.9
24.	Idle-Acceleration	4.1	1.1	1.0	1.0	1.0
	Average	4.6	1.4	1.2	1.0	1.0
17.	Deceleration	2.8	1.0	0.8	0.8	0
20.	Deceleration	3.3	1.0	0.9	0.6	0.7
21.	Deceleration	2.3	1.0	0.8	0.6	0.1
23.	Deceleration	2.4	1.0	0.8	0.6	0.1
	Average	2.7	1.0	0.8	0.7	0.2

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-24. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: July 30, 1971

Test Configuration: 60S Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	5.0	1.8	1.2	0.9	1.1
7.	24 mph	4.8	1.3	1.1	1.0	1.0
11.	1/2 load*	4.7	1.4	1.2	1.0	1.0
16.		4.8	1.4	1.2	0.9	1.0
	Average	4.8	1.5	1.2	1.0	1.0
2.	1200 rpm	4.3	1.1	1.1	1.0	1.0
8.	32 mph	4.7	1.6	1.1	1.0	1.0
9.	1/2 load	4.2	1.3	1.0	0.9	1.0
14.		4.8	1.8	1.1	1.0	1.0
	Average	4.5	1.5	1.1	1.0	1.0
4.	1500 rpm	4.3	1.2	1.1	1.0	1.0
6.	40 mph	4.6	1.2	1.1	1.0	1.0
12.	1/2 load	4.8	1.4	1.2	1.0	1.0
15.		4.4	1.4	1.0	1.0	1.0
	Average	4.5	1.3	1.1	1.0	1.0
3.	Idle	3.9	1.2	1.0	1.0	0.8
5.	Idle	3.9	1.0	1.0	0.9	0.9
10.	Idle	3.1	1.0	1.0	0.7	0.4
13.	Idle	3.9	1.0	1.0	1.0	0.8
	Average	3.7	1.1	1.0	0.9	0.7
17.	Idle-Acceleration	5.7	1.0	1.8	1.0	1.2
19.	Idle-Acceleration	6.6	2.0	1.8	1.2	1.8
23.	Idle-Acceleration	6.7	2.2	2.0	1.0	1.6
24.	Idle-Acceleration	6.1	1.9	1.8	1.0	1.3
	Average	6.3	2.0	1.9	1.1	1.5
18.	Deceleration	6.3	2.0	1.6	1.2	1.6
20.	Deceleration	6.1	1.8	1.6	1.2	1.4
21.	Deceleration	5.3	1.9	1.1	1.1	1.1
22.	Deceleration	5.3	1.7	1.4	1.0	1.0
	Average	5.8	1.9	1.4	1.1	1.3

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*Engine operated at a fuel rate midway betwnen maximum and no load fuel rate.

TABLE B-25. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: July 13, 1971

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2.	900 rpm	3.0	1.0	0.9	0.4	0.8
8.	24 mph	2.0	0.9	0.8	0.3	0.1
10.	1/2 load*	3.0	0.9	0.9	0.8	0.5
16.		3.1	0.9	1.0	0.6	0.8
	Average	2.8	0.9	0.9	0.5	0.6
3.	1200 rpm	3.0	1.0	0.9	0.8	0.4
5.	32 mph	2.4	1.0	0.8	0.5	0.1
12.	1/2 load	2.9	1.0	1.0	0.5	0.6
13.		2.0	0.9	0.8	0.4	0
	Average	2.6	1.0	0.9	0.6	0.3
4.	1500 rpm	3.3	1.0	0.8	0.9	0.6
7.	40 mph	3.5	1.0	1.0	0.9	0.8
9.	1/2 load	4.8	1.6	1.0	1.1	0.9
14.		3.5	1.1	1.0	1.0	0.4
	Average	3.8	1.2	1.0	1.0	0.7
1.	Idle	3.1	1.1	0.9	0.6	0.6
6.	Idle	2.6	1.0	0.9	0.5	0.5
11.	Idle	2.6	0.9	0.9	0.8	0.1
15.	Idle	2.5	1.0	0.9	0.6	0
	Average	2.7	1.0	0.9	0.6	0.3
17.	Idle-Acceleration	4.3	1.1	1.0	1.0	1.0
19.	Idle-Acceleration	3.8	1.0	1.0	0.9	0.8
22.	Idle-Acceleration	3.5	1.0	1.0	0.9	0.4
23.	Idle-Acceleration	3.9	1.1	1.1	1.0	0.8
	Average	3.9	1.1	1.0	1.0	0.8
18.	Deceleration	3.6	1.0	1.0	1.0	0.8
20.	Deceleration	3.5	1.1	1.1	1.0	0.4
21.	Deceleration	2.6	0.9	0.8	0.8	0.3
24.	Deceleration	2.6	1.0	1.0	0.5	0.4
	Average	3.1	1.0	1.0	0.8	0.5

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-26. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: July 14, 1971

Test Configuration: L8N Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	1.5	0.9	0.6	0.1	0
8.	24 mph	2.5	1.0	1.0	0.4	0.1
10.	1/2 load*	2.0	0.9	0.6	0.4	0.1
16.		1.0	0.9	0.1	0.1	0
	Average	1.8	0.9	0.6	0.3	0.1
3.	1200 rpm	1.9	1.0	0.8	0	0.1
7.	32 mph	1.9	1.0	0.9	0	0
9.	1/2 load	3.1	1.0	1.0	0.6	0.4
14.		1.9	1.0	0.4	0.3	0.3
	Average	2.2	1.0	0.8	0.2	0.2
4.	1500 rpm	2.4	1.0	0.9	0.3	0.1
6.	40 mph	2.9	1.0	1.0	0.5	0.4
12.	1/2 load	2.5	1.0	1.0	0.3	0.3
15.		1.8	0.9	0.5	0.5	0.1
	Average	2.4	1.0	0.9	0.4	0.2
2.	Idle	2.5	1.0	0.9	0.3	0.3
5.	Idle	2.9	1.0	0.9	0.6	0.4
11.	Idle	1.3	0.9	0.3	0.1	0.1
13.	Idle	2.3	0.9	0.9	0.4	0.1
	Average	2.3	1.0	0.8	0.4	0.2
18.	Idle-Acceleration	3.5	1.1	1.0	0.6	0.9
20.	Idle-Acceleration	2.3	1.0	0.6	0.4	0.3
23.	Idle-Acceleration	2.6	1.1	0.9	0.5	0.3
24.	Idle-Acceleration	3.3	1.1	0.8	0.8	0.6
	Average	2.9	1.1	0.8	0.6	0.5
17.	Deceleration	2.0	0.9	0.5	0.5	0.1
19.	Deceleration	1.9	0.9	0.5	0.4	0.1
21.	Deceleration	1.4	1.0	0.4	0	0
22.	Deceleration	1.4	1.0	0.3	0.4	0
	Average	1.7	1.0	0.4	0.3	0.1

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-27. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: July 16, 1971

Test Configuration: 60B Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	4.3	1.4	1.1	0.9	1.0
8.	24 mph	4.6	1.5	1.1	0.9	0.9
11.	1/2 load*	3.9	1.1	1.0	0.8	1.0
13.		3.9	1.0	1.0	1.0	0.9
	Average	4.2	1.3	1.1	0.9	1.0
3.	1200 rpm	4.6	1.6	1.0	0.9	1.0
6.	32 mph	4.4	1.1	1.0	0.9	1.0
9.	1/2 load	4.1	1.3	1.0	0.9	0.8
16.		4.9	1.6	1.0	1.0	1.0
	Average	4.5	1.4	1.0	0.9	1.0
4.	1500 rpm	4.1	1.0	1.0	1.0	1.0
7.	40 mph	4.9	1.6	1.3	0.9	0.9
12.	1/2 load	3.8	1.1	1.0	1.0	0.5
15.		4.5	1.1	1.0	0.9	0.6
	Average	4.3	1.2	1.1	1.0	0.8
2.	Idle	3.8	1.1	1.0	1.0	0.6
5.	Idle	3.4	1.1	0.9	0.6	0.8
10.	Idle	4.0	1.3	1.1	0.6	1.0
14.	Idle	3.6	1.0	0.9	1.0	0.6
	Average	3.7	1.1	1.0	0.8	0.8
17.	Idle-Acceleration	4.8	1.6	1.3	1.0	1.0
20.	Idle-Acceleration	6.5	2.0	1.4	1.3	1.6
21.	Idle-Acceleration	5.9	2.0	1.4	1.1	1.6
24.	Idle-Acceleration	6.8	2.0	1.6	1.3	1.8
	Average	6.0	1.9	1.4	1.2	1.5
18.	Deceleration	5.5	1.8	1.4	0.9	1.1
19.	Deceleration	5.9	1.9	1.3	1.0	1.1
22.	Deceleration	6.0	2.0	1.4	1.1	1.6
23.	Deceleration	5.7	2.0	1.4	1.0	1.3
	Average	5.7	1.9	1.4	1.0	1.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-28. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: March 13, 1973

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	2.6	1.0	0.9	0.5	0.4
8.	24 mph	2.6	1.0	0.9	0.4	0.4
12.	1/2 load*	1.6	0.8	0.5	0.5	0
14.		1.8	0.6	0.4	0.9	0.1
	Average	2.2	0.9	0.7	0.6	0.2
3.	1200 rpm	1.4	1.0	0.8	0.1	0
7.	32 mph	2.9	1.0	0.9	0.6	0.4
9.	1/2 load	2.0	1.0	0.4	0.5	0.4
16.		1.3	1.0	0.4	0	0
	Average	1.9	1.0	0.6	0.3	0.2
4.	1500 rpm	1.6	0.9	0.4	0.4	0.1
6.	40 mph	1.1	0.6	0.6	0.1	0
11.	1/2 load	1.8	0.8	0.8	0.3	0.1
15.		1.9	1.0	0.9	0.1	0.1
	Average	1.6	0.8	0.7	0.2	0.1
2.	Idle	2.5	1.0	0.6	0.8	0.4
5.	Idle	1.9	1.0	0.6	0.4	0.1
10.	Idle	2.8	1.0	0.6	0.5	0.6
13.	Idle	2.3	1.0	0.5	0.6	0.4
	Average	2.4	1.0	0.6	0.6	0.4
18.	Idle-Acceleration	3.4	1.1	1.0	0.8	0.6
20.	Idle-Acceleration	3.8	1.1	1.0	0.9	0.9
23.	Idle-Acceleration	3.4	1.0	1.0	0.9	0.9
24.	Idle-Acceleration	3.6	1.0	1.0	0.8	1.0
	Average	3.6	1.1	1.0	0.9	0.9
17.	Deceleration	2.4	1.0	0.9	0.4	0.3
19.	Deceleration	2.4	1.0	1.0	0.4	0.4
21.	Deceleration	2.1	1.6	0.8	0.5	0.4
22.	Deceleration	2.3	1.0	0.8	0.5	0.1
	Average	2.3	1.0	0.9	0.5	0.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-29. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: March 14, 1973

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	4.0	1.2	1.0	0.9	0.9
8.	24 mph	4.2	1.2	1.2	0.8	1.0
11.	1/2 load*	4.2	1.1	1.1	0.9	1.0
15.		4.7	1.6	1.0	1.0	1.0
	Average	4.3	1.3	1.1	0.9	1.0
4.	1200 rpm	3.0	1.1	1.0	0.9	0.6
6.	32 mph	3.8	1.1	1.0	0.9	0.8
12.	1/2 load	4.2	1.1	1.0	1.0	1.0
16.		4.1	1.0	1.0	1.0	1.0
	Average	3.8	1.1	1.0	1.0	0.9
1.	1500 rpm	4.4	1.4	1.1	0.9	1.0
7.	40 mph	3.8	1.1	1.1	0.8	0.9
10.	1/2 load	4.2	1.3	1.1	1.0	0.9
13.		4.1	1.1	1.0	1.0	0.9
	Average	4.4	1.2	1.1	0.9	0.9
2.	Idle	3.8	1.2	1.0	0.9	0.8
5.	Idle	2.6	1.0	0.9	0.6	0.3
9.	Idle	4.0	1.1	0.9	0.9	0.8
14.	Idle	3.3	1.0	1.0	1.0	0.3
	Average	3.4	1.1	1.0	0.9	0.6
17.	Idle-Acceleration	5.3	1.8	1.2	1.0	1.1
20.	Idle-Acceleration	4.8	1.7	1.0	1.0	1.1
21.	Idle-Acceleration	4.8	1.7	1.0	1.0	1.1
23.	Idle-Acceleration	3.8	1.2	0.9	0.7	0.8
	Average	4.7	1.6	1.0	0.9	1.0
18.	Deceleration	5.2	1.9	1.4	1.1	1.4
19.	Deceleration	5.2	1.9	1.1	1.3	1.6
22.	Deceleration	4.9	1.9	1.2	1.2	1.5
24.	Deceleration	5.3	1.9	1.3	1.2	1.5
	Average	5.2	1.9	1.3	1.2	1.5

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-30. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: February 23, 1972

Test Configuration: Stock Muffler, LSN Injectors
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	2.4	1.0	0.8	0.4	0.2
8.	24 mph	2.0	0.9	0.9	0.3	0.1
11.	1/2 load*	1.9	0.6	0.6	0.7	0.1
15.		1.9	0.8	1.0	0.2	0
	Average	2.1	0.8	0.8	0.4	0.1
4.	1200 rpm	1.9	1.0	0.9	0	0.1
6.	32 mph	1.8	1.0	0.4	0.6	0
12.	1/2 load	2.1	0.8	0.7	0.6	0.2
16.		2.1	0.9	0.8	0.3	0.2
	Average	2.0	0.9	0.7	0.4	0.1
1.	1500 rpm	2.7	1.0	0.9	0.4	0.3
7.	40 mph	2.9	1.0	0.8	0.7	0.4
10.	1/2 load	2.2	1.0	0.2	0.9	0.2
13.		2.3	0.9	0.7	0.8	0.2
	Average	2.5	1.0	0.7	0.7	0.3
2.	Idle	2.7	1.0	0.8	0.9	0.1
5.	Idle	3.0	1.1	0.7	0.7	0.7
9.	Idle	2.6	1.0	0.7	0.7	0.3
14.	Idle	3.0	1.1	0.9	0.7	0.7
	Average	2.8	1.1	0.8	0.8	0.5
17.	Idle-Acceleration	3.8	1.1	0.9	0.9	1.0
20.	Idle-Acceleration	4.0	1.1	1.0	1.0	1.0
21.	Idle-Acceleration	3.8	1.1	0.9	0.8	1.0
23.	Idle-Acceleration	3.8	1.1	0.9	1.0	1.0
	Average	3.9	1.1	0.9	0.9	1.0
18.	Deceleration	2.8	0.9	0.7	0.9	0.6
19.	Deceleration	2.3	0.6	0.8	0.9	0.1
22.	Deceleration	2.8	1.0	0.8	0.8	0.4
24.	Deceleration	2.8	1.0	1.0	0.7	0.2
	Average	2.7	0.9	0.8	0.8	0.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-31. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: February 24, 1972

Test Configuration: Stock Muffler, 608 Injectors
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
3.	900 rpm	4.1	1.2	1.1	0.9	0.9
6.	24 mph	4.1	1.1	1.1	1.0	0.9
10.	1/2 load*	3.9	1.2	1.0	1.0	0.7
16.		4.0	1.1	1.0	1.0	0.9
	Average	4.0	1.2	1.1	1.0	0.9
4.	1200 rpm	4.7	1.8	1.1	1.0	0.9
5.	32 mph	4.1	1.2	1.0	1.0	1.0
11.	1/2 load	4.3	1.6	1.1	1.0	0.9
13.		4.3	1.3	1.1	1.1	0.9
	Average	4.4	1.5	1.1	1.0	0.9
1.	1500 rpm	4.7	1.8	1.1	1.0	1.0
8.	40 mph	4.0	1.2	1.0	1.0	0.8
12.	1/2 load	4.7	1.8	1.1	1.0	0.9
15.		4.7	1.7	1.0	1.0	0.9
	Average	4.5	1.6	1.1	1.0	0.9
2.	Idle	3.3	1.1	1.0	1.0	0.4
7.	Idle	3.4	1.0	1.0	0.9	0.7
9.	Idle	3.2	1.1	0.9	0.9	0.3
14.	Idle	4.2	1.3	1.0	1.0	0.8
	Average	3.5	1.1	1.0	1.0	0.6
17.	Idle-Acceleration	3.7	1.0	1.0	0.8	1.0
20.	Idle-Acceleration	5.3	1.9	1.4	1.0	1.0
21.	Idle-Acceleration	5.3	2.0	1.2	1.0	1.2
23.	Idle-Acceleration	5.1	1.8	1.4	1.1	1.0
	Average	4.9	1.7	1.3	1.0	1.1
18.	Deceleration	3.6	1.2	1.0	0.7	0.8
19.	Deceleration	4.2	1.3	1.0	1.1	0.9
22.	Deceleration	4.2	1.2	1.0	1.0	1.0
24.	Deceleration	5.0	1.8	1.2	1.0	1.1
	Average	4.3	1.4	1.1	1.0	1.0

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-32. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: February 16, 1972

Test Configuration: L8N Injectors, Stock Muffler

Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	1.9	1.0	0.9	0.1	0.1
8.	24 mph	2.0	1.0	0.6	0.7	0
10.	1/2 load*	1.7	0.6	1.0	0.2	0.1
16.		1.7	1.0	0.7	0.1	0
	Average	1.8	0.9	0.8	0.3	0.1
3.	1200 rpm	2.3	0.9	1.0	0.6	0.1
7.	32 mph	2.7	1.0	0.4	1.0	0.2
9.	1/2 load	1.7	0.9	0.6	0.4	0
14.		2.0	0.9	0.7	0.4	0.1
	Average	2.2	0.9	0.7	0.6	0.1
4.	1500 rpm	2.0	1.0	0.7	0.3	0.1
6.	40 mph	2.7	0.9	1.0	0.8	0.2
12.	1/2 load	2.9	1.0	1.0	0.6	0.4
15.		1.7	0.8	0.4	0.4	0
	Average	2.4	0.9	0.8	0.5	0.2
2.	Idle	1.7	0.8	0.3	0.8	0.1
5.	Idle	2.3	1.0	0.4	0.8	0.3
11.	Idle	3.0	1.0	0.8	0.4	0.8
13.	Idle	1.7	1.0	0.2	0.6	0.3
	Average	2.2	1.0	0.4	0.7	0.4
18.	Idle-Acceleration	3.8	1.2	1.0	0.8	0.8
20.	Idle-Acceleration	3.7	1.1	1.0	0.8	1.0
23.	Idle-Acceleration	3.7	1.0	1.0	0.9	0.9
24.	Idle-Acceleration	3.0	1.1	1.0	0.4	0.9
	Average	3.6	1.1	1.0	0.7	0.9
17.	Deceleration	3.1	1.0	0.7	0.6	0.1
19.	Deceleration	2.4	1.0	0.9	0.3	0.4
21.	Deceleration	2.6	0.9	0.9	0.9	0.1
22.	Deceleration	2.3	1.0	0.8	0.3	0.6
	Average	2.6	1.0	0.8	0.5	0.3

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-33. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707	Test Configuration: 60S Injectors, Stock Muffler
Date: February 17, 1975	Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2.	900 rpm	4.4	1.6	1.0	1.0	1.0
5.	24 mph	3.7	1.0	0.9	1.0	0.7
11.	1/2 load*	3.2	1.0	1.0	0.8	0.6
14.		3.4	1.1	1.0	0.8	0.6
	Average	3.7	1.2	1.0	0.9	0.7
1.	1200 rpm	4.0	1.1	1.1	1.0	0.9
7.	32 mph	3.6	1.0	1.1	0.7	0.9
12.	1/2 load	3.7	1.0	1.0	1.0	0.7
13.		4.0	1.2	1.0	0.9	0.9
	Average	3.8	1.1	1.1	0.9	0.9
3.	1500 rpm	4.6	1.6	1.1	0.9	1.0
8.	40 mph	3.6	1.1	1.1	0.7	0.7
10.	1/2 load	3.9	1.1	1.0	1.0	0.8
15.		3.3	1.1	1.0	0.7	0.6
	Average	3.9	1.2	1.1	0.8	0.8
4.	Idle	3.6	1.0	1.0	1.0	0.7
6.	Idle	3.6	1.1	0.9	0.8	0.9
9.	Idle	3.8	1.2	1.0	1.1	0.7
16.	Idle	3.6	1.3	1.1	0.8	0.7
	Average	3.7	1.2	1.0	0.9	0.8
17.	Idle-Acceleration	4.2	1.2	1.1	1.0	1.0
20.	Idle-Acceleration	4.8	1.7	1.2	0.9	1.2
22.	Idle-Acceleration	4.8	1.6	1.2	1.0	1.0
23.	Idle-Acceleration	5.3	1.9	1.6	0.9	1.1
	Average	4.8	1.6	1.3	1.0	1.1
18.	Deceleration	4.2	1.2	1.0	1.1	1.0
19.	Deceleration	3.8	1.1	1.0	1.1	0.7
21.	Deceleration	4.3	1.6	1.0	1.1	1.0
24.	Deceleration	5.7	2.0	1.6	1.0	1.1
	Average	4.5	1.5	1.2	1.1	1.0

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-34. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: November 15, 1972

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
4.	900 rpm	1.7	1.0	0.4	0.2	0
7.	24 mph	2.8	1.0	0.9	0.6	0.2
9.	1/2 load*	2.3	0.9	0.9	0.4	0.2
16.		3.1	1.0	1.0	0.6	0.7
	Average	2.5	1.0	0.8	0.5	0.3
1.	1200 rpm	2.1	1.0	0.8	0.4	0.1
5.	32 mph	1.4	1.0	0.3	0	0
11.	1/2 load	2.1	1.0	0.7	0.3	0
14.		1.9	1.0	0.7	0.4	0.1
	Average	1.9	1.0	0.6	0.3	0.1
3.	1500 rpm	2.3	1.0	0.8	0.3	0.3
8.	40 mph	2.6	1.0	0.9	0.4	0.1
10.	1/2 load	2.8	0.9	0.8	0.6	0.3
13.		3.0	1.0	0.9	0.6	0.8
	Average	2.7	1.0	0.9	0.5	0.4
2.	Idle	1.8	1.0	0.4	0.3	0.2
6.	Idle	2.7	1.0	0.9	0.4	0.3
12.	Idle	3.0	1.0	0.9	0.6	0.8
16.	Idle	3.1	1.0	1.0	0.6	0.7
	Average	2.7	1.0	0.8	0.5	0.5
17.	Idle-Acceleration	3.8	1.1	1.0	0.9	0.9
19.	Idle-Acceleration	4.0	1.2	1.0	0.8	1.0
21.	Idle-Acceleration	3.7	1.1	1.0	0.6	1.0
23.	Idle-Acceleration	3.9	1.1	1.0	0.9	1.1
	Average	3.9	1.1	1.0	0.8	1.0
18.	Deceleration	3.0	1.0	1.0	1.0	0.2
20.	Deceleration	2.3	1.0	0.9	0.3	0.4
22.	Deceleration	2.9	1.0	0.9	0.6	0.6
24.	Deceleration	3.3	1.1	0.9	0.7	0.6
	Average	2.9	1.0	0.9	0.7	0.5

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-35. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 702
Date: November 16, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	4.9	1.7	1.3	0.9	1.0
8.	24 mph	4.0	1.4	1.1	0.7	0.9
12.	1/2 load*	4.3	1.1	1.1	1.0	1.1
16.		4.4	1.1	1.1	1.0	0.9
	Average	4.4	1.3	1.2	0.9	1.0
3.	1200 rpm	5.4	1.9	1.4	1.0	1.3
7.	32 mph	4.3	1.4	1.1	0.7	1.0
9.	1/2 load	4.1	1.3	1.0	0.9	1.0
13.		4.6	1.1	1.1	1.0	1.1
	Average	4.6	1.4	1.2	0.9	1.1
2.	1500 rpm	5.3	1.9	1.3	1.0	1.4
5.	40 mph	4.6	1.4	1.3	1.0	1.0
10.	1/2 load	4.9	1.6	1.1	1.0	1.3
15.		4.4	1.4	1.1	1.0	1.0
	Average	4.8	1.6	1.2	1.0	1.2
4.	Idle	3.9	1.3	1.1	0.9	0.9
6.	Idle	3.4	1.1	1.0	0.9	0.9
11.	Idle	4.3	1.3	1.0	1.1	1.0
14.	Idle	3.9	1.1	1.0	1.0	0.9
	Average	3.9	1.2	1.0	1.0	0.9
17.	Idle-Acceleration	4.9	1.7	1.0	1.0	1.3
19.	Idle-Acceleration	5.0	1.9	1.3	0.9	1.3
21.	Idle-Acceleration	5.0	1.7	1.3	1.0	1.1
23.	Idle-Acceleration	5.5	1.7	1.6	0.9	1.1
	Average	5.1	1.8	1.3	1.0	1.2
18.	Deceleration	3.7	1.1	1.0	1.0	0.6
20.	Deceleration	3.9	1.1	1.1	1.0	0.7
22.	Deceleration	4.3	1.3	1.1	0.9	1.0
24.	Deceleration	4.6	1.6	1.1	1.1	0.9
	Average	4.1	1.3	1.1	1.0	0.8

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-36. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: November 1, 1972

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2.	900 rpm	2.4	1.0	0.9	0.6	0.4
5.	24 mph	2.8	1.0	1.0	0.6	0.1
12.	1/2 load*	2.6	1.0	1.0	0.5	0.4
16.		3.3	1.0	1.0	0.6	0.6
	Average	2.8	1.0	1.0	0.6	0.4
4.	1200 rpm	2.9	1.0	1.0	0.8	0.1
7.	32 mph	3.9	1.3	1.0	0.9	0.8
10.	1/2 load	2.8	1.0	0.9	0.8	0.5
13.		2.6	1.0	1.0	0.6	0.4
	Average	3.1	1.1	1.0	0.8	0.5
1.	1500 rpm	4.1	1.5	1.0	0.8	0.8
6.	40 mph	3.4	1.0	1.0	0.5	0.5
9.	1/2 load	2.9	1.0	0.8	0.9	0.4
15.		3.4	1.0	1.0	0.8	0.6
	Average	3.5	1.1	1.0	0.8	0.6
3.	Idle	3.8	1.0	1.0	1.0	0.8
8.	Idle	3.8	1.0	1.0	1.0	0.9
11.	Idle	3.1	1.0	0.9	0.8	0.6
14.	Idle	3.3	1.0	1.0	0.8	0.6
	Average	3.5	1.0	1.0	0.9	0.7
17.	Idle-Acceleration	4.1	1.1	1.1	0.9	0.9
19.	Idle-Acceleration	2.9	1.0	1.0	0.4	0.6
21.	Idle-Acceleration	3.8	1.0	1.0	1.0	0.8
23.	Idle-Acceleration	3.3	1.0	1.1	0.6	0.6
	Average	3.5	1.0	1.1	0.7	0.7
18.	Deceleration	2.8	1.0	0.8	0.6	0.3
20.	Deceleration	2.8	1.0	1.0	0.4	0.4
22.	Deceleration	3.0	1.1	1.0	0.6	0.3
24.	Deceleration	2.6	1.0	0.9	0.6	0.4
	Average	2.8	1.0	0.9	0.6	0.4

---

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-37. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: November 2, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"C" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	4.9	1.8	1.3	0.8	1.1
8.	24 mph	4.8	1.6	1.0	1.1	0.9
10.	1/2 load*	4.8	1.7	1.3	0.9	0.9
14.		3.8	1.2	0.9	0.9	0.8
	Average	4.6	1.6	1.1	0.9	0.9
2.	1200 rpm	4.3	1.6	1.2	0.7	1.0
5.	32 mph	4.9	1.6	1.4	0.9	1.1
12.	1/2 load	4.4	1.4	1.1	0.9	0.9
15.		4.2	1.4	1.1	0.8	1.0
	Average	4.5	1.5	1.2	0.8	1.0
4.	1500 rpm	4.9	1.7	1.6	0.8	0.9
6.	40 mph	4.4	1.3	1.3	1.0	0.9
11.	1/2 load	4.2	1.3	1.1	0.8	0.9
13.		4.3	1.4	1.0	0.9	0.9
	Average	4.5	1.4	1.3	0.9	0.9
3.	Idle	4.1	1.3	1.0	0.9	1.0
7.	Idle	3.8	1.3	1.1	1.0	0.6
9.	Idle	3.7	1.1	1.0	0.8	0.9
16.	Idle	4.3	1.3	1.1	1.1	0.7
	Average	4.0	1.3	1.1	1.0	0.8
17.	Idle-Acceleration	4.9	1.8	1.0	1.0	1.2
19.	Idle-Acceleration	5.2	1.7	1.2	0.9	1.2
21.	Idle-Acceleration	4.8	1.7	1.1	0.9	1.2
23.	Idle-Acceleration	5.2	1.9	1.4	0.9	1.2
	Average	5.0	1.8	1.2	0.9	1.2
18.	Deceleration	5.1	1.8	1.1	1.2	1.0
20.	Deceleration	5.0	1.6	1.2	1.1	1.2
22.	Deceleration	5.0	1.6	1.2	1.0	1.1
24.	Deceleration	5.0	1.6	1.2	1.1	1.1
	Average	5.0	1.7	1.2	1.1	1.1

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-38. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: November 8, 1972

Test Configuration: L8N Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	3.4	1.0	1.0	0.8	0.6
5.	24 mph	2.8	1.0	0.9	0.6	0.3
12.	1/2 load*	2.7	1.0	1.0	0.3	0.6
16.		2.4	1.0	1.0	0.4	0.1
	Average	2.8	1.0	1.0	0.5	0.4
3.	1200 rpm	3.1	1.0	1.0	0.7	0.4
7.	32 mph	2.9	1.0	1.0	0.4	0.7
9.	1/2 load	2.9	1.0	0.9	0.8	0.4
15.		2.8	1.0	1.0	0.7	0.4
	Average	2.9	1.0	1.0	0.7	0.5
4.	1500 rpm	3.7	1.0	1.0	0.9	0.8
6.	40 mph	2.7	1.0	0.9	0.7	0.4
10.	1/2 load	3.3	1.1	0.9	0.8	0.6
14.		3.1	1.0	1.0	1.0	0.2
	Average	3.2	1.0	1.0	0.9	0.5
2.	Idle	3.6	1.0	1.0	0.8	0.7
8.	Idle	3.7	1.0	1.0	0.8	0.7
11.	Idle	4.1	1.1	1.0	1.0	1.0
13.	Idle	3.7	1.0	1.0	0.8	0.8
	Average	3.8	1.0	1.0	0.9	0.8
17.	Idle-Acceleration	4.4	1.3	1.1	0.9	1.0
19.	Idle-Acceleration	4.6	1.4	1.1	1.0	1.0
21.	Idle-Acceleration	3.9	1.2	1.0	0.8	0.9
23.	Idle-Acceleration	4.3	1.4	1.2	0.9	0.8
	Average	4.3	1.3	1.1	0.9	0.9
18.	Deceleration	3.3	1.0	0.9	0.8	0.7
20.	Deceleration	3.7	1.1	1.0	0.9	0.9
22.	Deceleration	4.0	1.2	1.1	1.0	1.0
24.	Deceleration	4.3	1.3	1.0	1.0	1.0
	Average	3.8	1.2	1.0	0.9	0.9

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE B-39. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 707
Date: November 9, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Condition	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2.	900 rpm	4.1	1.1	1.2	0.8	1.0
7.	24 mph	4.3	1.2	1.1	1.0	0.9
10.	1/2 load*	4.1	1.0	1.1	1.0	0.9
13.		3.7	1.0	1.0	1.0	0.8
	Average	4.1	1.1	1.1	1.0	0.9
1.	1200 rpm	4.7	1.6	1.3	0.7	1.0
5.	32 mph	3.9	1.1	1.0	1.0	0.9
12.	1/2 load	4.0	1.0	1.0	1.0	0.8
16.		3.9	1.1	1.2	0.9	0.7
	Average	4.1	1.2	1.1	0.9	0.9
4.	1500 rpm	4.6	1.3	1.2	1.0	1.1
6.	40 mph	4.7	1.3	1.2	1.0	1.0
9.	1/2 load	4.4	1.3	1.0	1.0	0.9
15.		3.9	1.1	1.0	1.0	0.9
	Average	4.4	1.3	1.1	1.0	1.0
3.	Idle	3.7	1.2	1.1	1.0	0.7
8.	Idle	3.7	1.0	1.0	0.9	0.8
11.	Idle	4.0	1.3	0.9	0.9	1.0
14.	Idle	4.1	1.3	1.0	1.1	0.7
	Average	3.9	1.2	1.0	0.9	0.8
17.	Idle-Acceleration	5.0	1.7	1.0	1.0	1.2
19.	Idle-Acceleration	5.2	1.8	1.2	1.0	1.3
21.	Idle-Acceleration	5.4	2.0	1.4	1.0	1.1
23.	Idle-Acceleration	5.3	1.9	1.7	1.1	1.0
	Average	5.2	1.9	1.3	1.0	1.2
18.	Deceleration	4.6	1.4	1.1	1.0	1.0
20.	Deceleration	5.2	1.8	1.1	1.2	1.1
22.	Deceleration	4.9	1.3	1.2	1.0	1.1
24.	Deceleration	5.6	2.0	1.2	1.1	1.1
	Average	5.1	1.6	1.2	1.1	1.1

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*Engine operated at a fuel rate midway between maximum and no load fuel rate.

APPENDIX C

GASEOUS EMISSIONS DATA TAKEN DURING ODOR TESTS

TABLE C-1. EXHAUST EMISSIONS SUMMARY

[illegible]

TABLE C-2. EXHAUST EMISSIONS SUMMARY

[illegible]

TABLE C-3. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: October 1, [illegible]

Test Configuration: [illegible] Injectors, Stock Muffler

Fuel: EM-155-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic† Aldehydes, ppm
24 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
900 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-4. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: September 14, [illegible]

Test Configuration: [illegible] Injectors, Catalytic Muffler

Fuel: EM-155-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic† Aldehydes, ppm
24 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
900 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-5. EXHAUST EMISSIONS SUMMARY

Bus: 206
Date: September 11, 1970

Test Configuration: [illegible] Injectors,
Stock Muffler
Fuel: EM-155-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO₂, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
25 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
800 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-6. EXHAUST EMISSIONS SUMMARY

Bus: 206
Date: September 17, 1970

Test Configuration: [illegible] Injectors,
Stock Muffler
Fuel: EM-155-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO₂, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
25 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
800 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-7. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: August 31, [illegible]

Test Configuration: [illegible] Injectors, Catalytic Muffler
Fuel: EM-[illegible] (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO$_2$, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-8. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: September 1, [illegible]

Test Configuration: [illegible] Injectors, Stock Muffler
Fuel: EM-[illegible] (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO$_2$, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-9. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: September 3, 1970

Test Configuration: [illegible] Injectors, Stock Muffler
Fuel: EM-151-F (No. 1 Diesel)

Condition	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
16 mph 600 rpm 1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32 mph 1200 rpm 1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40 mph 1500 rpm 1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-10. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: April 27, 1971

Test Configuration: [illegible] Injectors, Catalytic Muffler
Fuel: EM-151-F (No. 1 Diesel)

Condition	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
22 mph 900 rpm 1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph [illegible] rpm 1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph [illegible] rpm 1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-11. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: April 28, 1971

Test Configuration: [illegible] Injectors; Stock Muffler
Fuel: EM-[illegible]-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
22 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
600 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1800 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-12. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: April 30, 1971

Test Configuration: [illegible] Injectors; Stock Muffler
Fuel: EM-[illegible]-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
22 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
600 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1800 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-13. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: April 14, 1971

Test Configuration: LBH Injectors, Catalyst Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO₂, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-14. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: April 14, 1971

Test Configuration: LBH Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	CO₂, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes, ppm†
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-15. EXHAUST EMISSIONS SUMMARY

Run: [illegible]
Date: April 16, 1971

Test Configuration: [illegible] Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic† Aldehydes, ppm
23 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-16. EXHAUST EMISSIONS SUMMARY

Run: 107
Date: March 30, 1971

Test Configuration: LMR Injectors, Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic† Aldehydes, ppm
23 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-17. EXHAUST EMISSIONS SUMMARY

Run: 107
Date: March 31, 1971

Test Configuration: 180 Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic† Aldehydes, ppm
25 mph	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
900 rpm	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30 mph	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37 mph	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-18. EXHAUST EMISSIONS SUMMARY

Run: 107
Date: April 2, 1971

Test Configuration: 180 Injectors, Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic† Aldehydes, ppm
25 mph	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
900 rpm	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30 mph	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37 mph	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1/2 load*	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
As-measured avg		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Engine operated at fuel rate midway between maximum and no load fuel rates.
†As ppm formaldehyde.

TABLE C-19. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: August 17, 1971

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	188	63	703	0.4	2.0	12.4
900 rpm	5	188	88	717	0.4	2.7	11.4
1/2 load**	12	188	76	690	0.4	3.0	10.6
	15	188	88	717	0.4	2.0	12.4
As-measured Avg.		188	79	707	0.4	2.2	11.7
32 mph	2	175	88	677	0.5	2.7	12.4
1200 rpm	8	163	50	677	0.5	2.7	13.3
1/2 load**	11	175	63	664	0.4	2.7	11.5
	16	175	63	638	0.4	2.7	10.6
As-measured Avg.		172	66	664	0.5	2.7	12.0
40 mph	1	163	25	586	0.5	3.3	13.5
1500 rpm	7	163	63	651	0.4	3.4	14.2
1/2 load**	9	188	76	599	0.4	3.4	14.2
	14	163	63	625	0.5	2.7	12.4
As-measured Avg.		169	57	615	0.5	3.2	13.6
Idle	4	150	114	249	0.9	4.7	16.9
Idle	6	150	126	260	0.8	2.7	16.9
Idle	10	150	139	239	1.2	4.7	14.2
Idle	13	163	139	249	0.8	4.0	16.9
As-measured Avg.		153	130	249	0.9	4.0	16.2

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-20. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: August 18, 1971

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	225	76	574	0.2	2.7	8.9
900 rpm	7	225	76	612	0.2	2.0	10.6
1/2 load**	12	238	50	638	0.5	4.0	11.5
	13	225	76	651	0.2	2.7	10.6
As-measured Avg.		228	70	619	0.3	2.9	10.4
32 mph	4	213	50	561	0.4	2.0	12.4
1200 rpm	6	213	50	549	0.2	2.7	10.6
1/2 load**	9	225	63	586	0.4	2.0	12.4
	14	213	38	574	0.2	2.0	17.9
As-measured Avg.		216	50	568	0.3	2.2	13.3
40 mph	1	213	38	561	0.2	2.0	17.9
1500 rpm	8	213	50	561	0.2	2.0	11.5
1/2 load**	10	225	38	561	0.4	3.4	12.4
	16	213	38	612	0.4	3.4	16.9
As-measured Avg.		216	41	574	0.3	2.7	14.7
Idle	2	213	114	207	0.6	4.0	10.6
Idle	5	225	114	207	0.7	4.0	15.1
Idle	11	213	101	218	0.6	2.7	15.1
Idle	15	213	101	218	0.4	2.7	19.5
As-measured Avg.		216	108	213	0.6	3.4	15.1

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-21. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: August 20, 1971

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	2850	255	549	1.3	7.4	16.1
900 rpm	8	2750	216	586	1.1	8.1	16.1
1/2 load**	11	2850	203	574	1.2	7.4	11.6
	15	2724	178	612	1.2	6.8	17.0
As-measured Avg.		2794	213	580	1.2	7.4	15.2
32 mph	4	2825	152	536	1.2	7.4	15.2
1200 rpm	6	2825	165	536	1.2	7.4	17.0
1/2 load**	12	2775	139	561	1.4	6.8	16.1
	14	2800	139	549	1.1	6.1	16.1
As-measured Avg.		2806	149	546	1.2	6.9	16.1
40 mph	1	2450	126	536	1.1	5.4	14.2
1500 rpm	7	2475	139	524	0.9	6.8	15.2
1/2 load**	9	2450	126	561	1.2	6.8	17.0
	16	2500	126	574	1.1	6.1	16.1
As-measured Avg.		2469	129	549	1.1	6.3	15.6
Idle	2	900	203	176	1.4	8.1	18.6
Idle	5	900	203	197	1.7	9.5	17.9
Idle	10	850	178	186	1.2	9.5	15.2
Idle	13	850	178	197	1.4	9.5	19.6
As-measured Avg.		875	191	189	1.5	9.2	17.8

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-22. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: July 27, 1971

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	225	126	717	0.6	2.0	11.6
900 rpm	5	200	101	744	0.6	2.0	9.8
1/2 load**	10	237	114	730	0.6	2.0	14.0
	13	237	126	799	0.6	2.7	14.0
As-measured Avg.		225	117	748	0.6	2.2	12.4
32 mph	1	187	101	612	0.4	2.0	10.6
1300 rpm	8	200	88	730	0.5	5.3	10.6
1/2 load**	9	250	101	690	0.6	8.1	17.0
	16	200	76	717	0.4	2.0	15.2
As-measured Avg.		209	92	687	0.5	4.4	13.4
40 mph	4	200	76	637	0.5	2.7	15.2
1500 rpm	6	200	76	690	0.4	4.1	13.4
1/2 load**	11	237	101	690	0.5	3.4	14.0
	15	225	88	703	0.5	2.7	16.1
As-measured Avg.		216	85	680	0.5	3.2	14.7
Idle	2	175	152	217	0.8	4.0	16.0
Idle	7	137	178	239	0.5	8.1	16.1
Idle	12	175	152	239	0.6	8.1	15.2
Idle	14	175	139	239	0.5	8.1	15.2
As-measured Avg.		166	155	234	0.6	7.1	15.6

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-23. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: July 28, 1971

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	2	250	152	758	0.7	2.0	11.5
900 rpm	7	250	139	717	0.6	2.0	10.7
1/2 load**	9	262	139	730	0.5	2.7	9.8
	15	275	176	827	0.4	2.7	8.9
As-measured Avg.		259	152	758	0.6	2.4	10.2
32 mph	4	200	76	651	0.6	1.3	8.0
1300 rpm	8	212	76	690	0.5	2.0	9.8
1/2 load**	11	237	63	717	0.8	2.0	8.0
	14	225	63	717	0.5	2.0	8.9
As-measured Avg.		219	70	694	0.6	1.8	8.7
40 mph	1	187	50	625	0.9	3.4	13.3
1500 rpm	6	200	50	599	0.7	2.7	9.8
1/2 load**	12	212	38	637	0.6	2.0	8.9
	16	212	38	690	0.7	2.0	8.9
As-measured Avg.		203	44	638	0.7	2.5	10.2
Idle	3	225	165	207	1.5	4.7	16.0
Idle	5	225	178	197	1.2	4.7	13.3
Idle	10	250	152	207	1.2	4.7	15.1
Idle	13	250	139	217	1.2	4.7	13.3
As-measured Avg.		238	159	207	1.3	4.7	14.4

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-24. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: July 30, 1971

Test Configuration: 608 Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	2388	216	612	1.7	7.4	19.6
900 rpm	7	2338	255	651	1.8	8.1	21.4
1/2 load**	11	2312	203	664	1.9	8.2	23.4
	16	2350	216	690	1.8	9.5	23.4
As-measured Avg.		2347	223	654	1.8	8.3	22.0
32 mph	2	2300	165	638	1.7	6.8	19.6
1200 rpm	8	2125	165	625	1.9	8.2	24.3
1/2 load**	9	2275	132	651	1.6	9.5	24.1
	14	2300	146	664	1.9	8.2	23.4
As-measured Avg.		2250	152	645	1.8	8.2	22.9
40 mph	4	2225	126	586	2.0	8.1	24.1
1500 rpm	6	2225	126	586	1.9	9.5	25.9
1/2 load**	12	2188	101	612	1.9	6.8	22.5
	15	2212	101	612	1.8	8.2	25.2
As-measured Avg.		2213	114	599	1.9	8.2	24.4
Idle	3	962	203	186	2.7	8.1	23.4
Idle	5	925	203	197	2.6	7.4	26.8
Idle	10	912	190	186	2.7	9.5	25.0
Idle	13	950	178	197	2.5	8.9	27.0
As-measured Avg.		937	194	192	2.6	8.5	25.6

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-25. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: July 18, 1971

Test Configuration: LSN Injectors,
Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	2	225	203	717	0.1	1.3	7.8
900 rpm	8	200	126	690	0.2	0.7	9.8
1/2 load**	10	200	139	717	0.2	0.7	8.0
	16	225	126	717	0.4	0.7	8.0
As-measured Avg.		213	149	710	0.2	0.9	8.4
32 mph	5	187	101	644	0.5	1.3	16.0
1200 rpm	3	200	114	717	0.4	1.3	14.0
1/2 load**	12	175	87	758	0.5	0.7	14.2
	13	175	87	771	0.5	0.7	13.3
As-measured Avg.		184	97	723	0.5	1.0	14.4
40 mph	7	175	76	637	0.2	1.3	8.0
1500 rpm	4	175	76	637	0.4	1.3	8.9
1/2 load**	9	212	101	612	0.4	2.0	12.4
	14	175	50	499	0.4	1.3	8.9
As-measured Avg.		184	76	596	0.4	1.5	9.6
Idle	1	162	114	239	0.5	2.6	10.3
Idle	6	175	126	249	0.4	2.0	11.5
Idle	11	150	101	260	0.5	2.0	11.5
Idle	15	150	87	260	0.4	2.7	9.8
As-measured Avg.		159	107	252	0.5	2.3	10.8

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-26. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: July 14, 1971

Test Configuration: L5N Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	225	178	690	0.7	2.7	8.9
900 rpm	8	250	165	717	0.6	2.7	9.8
1/2 load**	10	262	105	758	0.6	2.7	9.8
	16	250	152	744	0.6	2.7	9.8
As-measured Avg.		247	150	727	0.6	2.7	9.6
32 mph	7	225	126	799	0.5	2.0	10.7
1200 rpm	3	200	120	744	0.6	2.7	9.8
1/2 load**	9	262	139	771	0.5	2.0	9.8
	14	250	101	799	0.5	2.7	10.7
As-measured Avg.		234	122	778	0.5	2.4	10.3
40 mph	6	225	101	717	0.5	2.0	9.8
1500 rpm	4	200	76	664	0.6	2.0	8.9
1/2 load**	12	250	76	744	0.7	2.7	8.9
	15	250	76	744	0.6	2.7	11.5
As-measured Avg.		231	82	717	0.6	2.4	9.8
Idle	2	212	139	228	0.9	5.4	12.4
Idle	5	225	126	239	0.8	3.4	11.5
Idle	11	250	101	239	0.8	4.0	11.5
Idle	13	250	101	249	0.7	4.7	13.3
As-measured Avg.		234	117	239	0.8	4.4	12.2

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-27. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: July 16, 1971

Test Configuration: 608 Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	1937	114	281	1.5	10.1	24.8
900 rpm	8	1975	465	827	1.7	10.1	24.1
1/2 load**	11	1925	333	827	1.9	10.1	25.0
	13	1950	399	827	1.7	10.8	23.2
As-measured Avg.		1947	328	691	1.7	10.3	24.3
32 mph	6	1975	255	799	1.7	9.5	24.1
1200 rpm	3	1887	50	303	1.5	9.4	25.7
1/2 load**	9	1900	216	827	1.6	9.5	25.0
	16	1937	216	870	1.3	10.2	24.3
As-measured Avg.		1925	184	700	1.6	9.7	24.8
40 mph	7	1950	178	856	1.8	12.8	25.0
1500 rpm	4	1875	50	393	1.5	11.4	25.7
1/2 load**	12	1937	178	856	1.8	11.5	25.9
	15	1900	178	841	1.9	10.8	25.9
As-measured Avg.		1916	146	737	1.8	11.6	25.6
Idle	2	800	38	76	2.0	11.4	19.5
Idle	5	800	203	217	2.2	10.7	22.2
Idle	10	775	203	217	2.2	12.2	19.6
Idle	14	750	203	239	2.0	11.5	23.2
As-measured Avg.		781	162	187	2.1	11.5	21.1

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-20. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: March 13, 1972

Test Configuration: LSH Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	276	174	742	4.6	50.4	72.3
900 rpm	8	292	161	756	5.2	21.8	59.4
1/2 load**	12	296	188	783	5.3	15.6	38.6
	14	296	147	756	5.2	13.7	10.4
As-measured Avg.		290	168	759	5.1	25.4	45.2
32 mph	7	276	120	715	5.3	15.6	37.8
1200 rpm	3	252	94	662	4.2	62.2	93.6
1/2 load**	9	284	94	702	5.0	16.2	41.9
	16	276	94	688	4.9	14.3	20.5
As-measured Avg.		272	101	692	4.9	27.1	48.5
40 mph	6	228	80	649	4.3	15.6	60.8
1500 rpm	4	224	80	623	4.3	28.6	46.8
1/2 load**	11	252	67	662	5.0	13.7	24.6
	15	244	67	636	4.9	13.1	22.2
As-measured Avg.		237	74	643	4.6	17.8	38.6
Idle	2	196	120	302	1.3	34.8	57.5
Idle	5	224	120	281	1.2	18.0	31.2
Idle	10	236	120	292	1.4	14.9	23.0
Idle	13	248	120	270	1.4	13.7	24.6
As-measured Avg.		226	120	286	1.3	20.4	34.1

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-29. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: March 14, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-163-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	2160	201	585	4.0	9.4	27.2
900 rpm	8	1616	188	623	4.1	18.7	36.2
1/2 load**	11	1616	201	636	4.1	11.2	28.8
	15	1664	201	649	4.0	15.6	33.7
As-measured Avg.		1764	198	623	4.1	13.7	31.5
32 mph	6	1456	174	649	4.3	13.7	37.0
1200 rpm	4	2176	188	636	4.4	14.3	39.5
1/2 load**	12	1648	174	702	4.4	18.7	38.7
	16	1864	147	702	4.3	15.6	32.1
As-measured Avg.		1786	170	672	4.4	15.6	36.8
40 mph	7	1476	134	649	4.6	19.3	39.5
1500 rpm	1	2096	147	623	4.4	15.6	34.6
1/2 load**	10	1680	120	702	4.6	15.6	33.7
	13	1680	120	715	4.3	18.1	42.0
As-measured Avg.		1733	130	672	4.5	17.2	37.5
Idle	2	544	161	227	1.3	10.0	25.5
Idle	5	336	147	238	1.2	10.0	28.0
Idle	9	368	134	238	1.3	9.4	23.9
Idle	14	368	134	248	1.2	11.2	29.6
As-measured Avg.		404	144	238	1.3	10.2	26.8

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-30. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: February 23, 1972

Test Configuration: LSN injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	240	107	675	4.0	10.6	22.3
900 rpm	8	216	107	729	4.1	11.2	19.8
1/2 load**	11	228	107	729	3.8	11.8	20.6
	15	216	120	742	3.8	10.0	23.1
As-measured Avg.		225	110	718	3.9	10.9	21.4
32 mph	6	224	94	688	4.0	11.8	23.1
1200 rpm	4	216	80	686	3.9	9.4	21.5
1/2 load**	12	220	80	742	3.8	10.6	27.2
	16	228	94	742	4.0	10.6	23.1
As-measured Avg.		222	87	715	3.9	10.6	23.7
40 mph	7	200	67	649	4.0	11.2	25.6
1500 rpm	1	196	67	623	3.8	10.0	26.4
1/2 load**	10	196	67	623	3.8	11.9	30.5
	13	196	67	686	3.9	10.6	23.1
As-measured Avg.		197	67	645	3.9	10.9	26.4
Idle	2	220	120	217	1.0	13.1	27.2
Idle	5	228	134	227	1.0	15.0	29.7
Idle	9	220	120	259	1.1	12.5	27.2
Idle	14	232	120	259	1.2	15.0	27.2
As-measured Avg.		225	123	240	1.1	13.6	27.8

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-31. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: February 24, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	3	1808	242	729	4.3	22.5	51.2
900 rpm	6	1808	228	756	4.1	20.0	61.9
1/2 load**	10	2208	256	756	4.4	20.6	49.5
	16	2176	256	662	4.3	23.1	52.6
As-measured Avg.		2000	245	725	4.3	21.5	53.8
32 mph	5	1712	188	811	4.4	30.0	66.8
1200 rpm	4	1744	188	783	4.5	23.1	61.9
1/2 load**	11	2144	215	770	4.6	29.3	56.9
	13	2144	201	756	4.4	25.0	53.6
As-measured Avg.		1936	198	780	4.5	26.8	60.0
40 mph	8	2096	188	783	3.4	30.6	63.5
1500 rpm	1	1680	147	783	4.6	20.6	49.5
1/2 load**	12	2112	174	840	4.7	27.5	70.1
	15	2032	161	675	4.7	30.6	63.5
As-measured Avg.		1980	167	770	4.4	27.3	61.6
Idle	2	752	174	227	1.0	15.0	37.1
Idle	7	864	215	206	1.2	18.1	49.5
Idle	9	896	228	217	1.2	18.7	51.2
Idle	14	880	215	206	1.2	16.9	55.3
As-measured Avg.		848	208	214	1.2	17.1	48.2

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-32. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: February 16, 1972

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	102	134	868	4.3	0	5.0	18.1
900 rpm	9	96	134	868	4.5	0	4.4	19.8
1/2 load**	10	200	120	854	4.3	0	4.4	14.8
	16	238	120	854	4.3	0	5.6	18.9
As-measured Avg.		159	127	861	4.4	0	4.9	17.9
32 mph	3	92	120	942	4.4	0	8.1	23.9
1200 rpm	7	82	107	868	4.6	0	5.6	17.3
1/2 load**	9	250	107	912	4.7	0	8.7	27.2
	14	232	94	897	4.6	0	7.5	16.5
As-measured Avg.		164	107	905	4.6	0	7.5	21.2
40 mph	4	90	80	868	4.3	0	4.4	18.1
1500 rpm	6	94	80	840	4.2	0.1	6.2	23.0
1/2 load**	12	84	80	854	4.6	0	8.7	17.3
	15	312	80	868	4.5	0	8.1	14.0
As-measured Avg.		145	80	858	4.4	0	6.9	18.1
Idle	2	186	134	270	1.0	0	8.1	14.8
Idle	5	162	120	281	1.0	0	8.1	14.8
Idle	11	148	120	281	1.2	0	7.5	17.3
Idle	13	218	134	281	1.2	0	9.4	20.6
As-measured Avg.		179	127	278	1.1	0	8.3	16.9

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-33. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: February 17, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO$_2$, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	2	1336	242	854	4.2	0	16.2	33.0
900 rpm	5	1376	256	897	4.2	0.2	19.3	35.5
1/2 load**	11	-	215	840	4.0	0.2	17.5	34.7
	14	1328	201	883	4.1	0.2	17.5	34.7
As-measured Avg.		1347	229	869	4.1	0.2	17.6	34.5
32 mph	1	1312	161	797	4.1	0	18.7	34.7
1200 rpm	7	1344	147	854	4.3	0.2	17.5	26.4
1/2 load**	12	-	147	897	4.1	0.3	18.1	39.6
	13	1280	134	897	4.2	0.3	17.5	36.3
As-measured Avg.		1312	147	861	4.2	0.2	18.0	34.2
40 mph	3	1328	120	869	4.2	0.3	17.5	28.1
1500 rpm	8	1352	120	897	4.3	0.3	28.1	47.9
1/2 load**	10	1344	120	987	4.6	0.2	17.5	37.1
	15	1376	120	927	4.3	0.2	16.2	61.9
As-measured Avg.		1350	120	920	4.4	0.3	19.8	43.8
Idle	4	584	161	248	1.2	0.2	26.8	46.2
Idle	6	544	174	259	1.1	0.1	22.5	42.1
Idle	9	576	147	259	1.2	0.5	21.8	43.7
Idle	16	584	134	259	1.2	0.1	17.5	37.1
As-measured Avg.		572	154	256	1.2	0.2	22.2	42.3

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-34. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: November 15, 1972

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	4	134	62	522	2.7	0	0.6	9.9
900 rpm	7	122	62	542	2.9	0.1	0.6	10.7
1/2 load**	9	130	62	522	2.8	0.1	1.2	11.5
	15	138	62	502	2.7	0	1.2	10.7
As-measured Avg.		131	62	522	2.8	0.1	0.9	10.7
32 mph	1	128	62	498	2.9	0.2	3.5	13.1
1200 rpm	5	132	62	522	2.8	0	3.1	11.5
1/2 load**	11	130	50	522	2.8	0	3.1	11.5
	14	136	50	522	2.8	0	2.5	10.7
As-measured Avg.		132	56	516	2.8	0.1	2.8	11.7
40 mph	3	120	62	486	2.9	0.2	1.9	13.1
1500 rpm	8	116	38	474	2.8	0	1.2	9.9
1/2 load**	10	118	38	486	2.9	0	1.9	10.7
	13	128	38	498	2.9	0	1.2	12.3
As-measured Avg.		121	44	486	2.9	0.1	1.6	11.5
Idle	2	140	151	175	0.8	0.8	3.1	14.8
Idle	6	138	151	186	0.7	0.7	3.7	13.1
Idle	12	138	138	175	0.7	0.6	3.1	15.6
Idle	16	154	138	186	0.7	0.6	3.7	15.6
As-measured Avg.		143	145	181	0.7	0.7	3.4	14.8

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-35. EXHAUST EMISSION SUMMARY

Vehicle: Bus 702
Date: November 16, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	1440	164	623	3.3	0.6	3.7	17.3
900 rpm	8	1408	151	610	3.1	0.6	5.6	18.9
1/2 load**	12	1456	176	610	3.1	0.7	5.6	18.9
	16	1568	164	649	3.1	0.7	4.4	20.5
As-measured Avg.		1468	164	623	3.2	0.7	4.8	18.9
32 mph	3	1504	126	610	3.3	0.6	5.0	19.7
1200 rpm	7	1552	113	610	3.2	0.8	5.0	22.2
1/2 load**	9	1392	113	623	3.2	0.5	5.0	17.2
	13	1456	126	649	3.2	0.6	6.2	19.7
As-measured Avg.		1476	120	623	3.2	0.7	5.3	19.7
40 mph	2	1376	113	649	3.4	0.7	4.4	18.1
1500 rpm	5	1376	113	636	3.2	0.6	5.6	19.7
1/2 load**	10	1424	113	662	3.3	0.6	5.0	19.7
	15	1376	113	649	3.2	0.5	5.0	19.7
As-measured Avg.		1388	113	649	3.3	0.6	5.0	19.3
Idle	4	512	164	302	0.9	0.6	5.6	19.7
Idle	6	496	151	227	1.0	0.8	5.0	20.5
Idle	11	448	164	196	0.9	0.7	5.0	19.0
Idle	14	464	164	196	0.9	0.7	5.0	19.7
As-measured Avg.		480	161	230	0.9	0.7	5.2	19.7

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-36. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: November 1, 1972

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	2	206	62	649	4.1	3.4	1.9	11.5
900 rpm	5	212	62	702	4.2	3.4	1.9	13.2
1/2 load**	12	216	100	702	4.2	4.5	2.5	14.0
	16	224	100	702	4.1	4.5	3.1	14.8
As-measured Avg.		214	81	689	4.2	4.0	2.4	13.4
32 mph	4	198	88	636	3.9	4.5	2.5	15.6
1200 rpm	7	184	88	597	3.9	3.4	3.1	13.2
1/2 load**	10	196	88	662	4.0	4.5	3.7	16.5
	13	198	88	662	3.9	3.4	3.1	14.8
As-measured Avg.		194	88	639	3.9	4.0	3.4	15.0
40 mph	1	184	62	597	4.2	5.6	3.7	14.0
1500 rpm	6	182	62	623	4.1	4.5	3.1	14.0
1/2 load**	9	184	62	623	4.0	6.7	3.1	14.0
	15	192	62	636	4.0	5.6	3.1	14.8
As-measured Avg.		186	62	620	4.1	5.6	3.3	14.2
Idle	3	200	184	217	1.1	9.0	3.1	16.5
Idle	8	196	202	206	1.1	14.6	3.7	18.2
Idle	11	194	189	217	1.1	13.5	3.7	16.5
Idle	14	194	176	217	1.1	12.4	3.6	17.3
As-measured Avg.		196	188	214	1.1	12.4	3.5	17.1

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* As ppm formaldehyde
** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-37. EXHAUST EMISSION SUMMARY

Vehicle: Bus 704
Date: November 2, 1972

Test Configuration: 60S Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	1744	266	728	4.0	18.0	8.1	18.9
900 rpm	8	1760	241	756	3.9	19.1	7.5	21.4
1/2 load**	10	1792	241	742	3.8	20.2	6.2	23.0
	14	1840	228	742	3.8	15.7	6.2	21.4
As-measured Avg.		1784	244	742	3.9	18.3	7.0	21.2
32 mph	2	1728	189	770	4.0	20.2	7.5	17.3
1200 rpm	5	1616	189	783	4.0	18.0	7.5	21.4
1/2 load**	12	1776	151	756	3.8	16.9	7.5	23.0
	15	1808	164	756	3.8	18.0	6.2	23.9
As-measured Avg.		1732	173	766	3.9	18.3	7.2	21.4
40 mph	4	1616	138	742	4.0	16.9	7.5	20.6
1500 rpm	6	1680	126	770	4.1	20.2	6.9	24.7
1/2 load**	11	1648	126	770	3.9	18.0	8.1	26.3
	13	1696	113	797	3.8	18.0	8.7	23.9
As-measured Avg.		1660	125	769	4.0	18.3	7.8	23.9
Idle	3	656	228	240	1.2	25.8	7.5	23.0
Idle	7	576	228	238	1.1	23.6	7.5	24.7
Idle	9	640	202	238	1.1	29.2	8.1	23.0
Idle	16	704	215	227	1.0	27.0	7.5	23.9
As-measured Avg.		644	218	236	1.1	26.4	7.7	23.7

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* As ppm formaldehyde

** Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE C-30. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: November 8, 1972

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	1	260	126	715	4.2	0.5	16.8	36.0
900 rpm	5	270	126	742	4.1	0.5	15.5	35.2
1/2 load**	12	282	164	728	4.0	0.7	14.9	30.3
	16	300	138	756	4.0	0.6	16.8	36.9
As-measured Avg.		278	139	735	4.1	0.6	16.0	34.6
32 mph	3	248	113	770	4.4	0.7	8.1	22.9
1200 rpm	7	234	138	783	4.5	0.6	7.5	22.9
1/2 load**	9	246	100	783	4.4	0.7	6.2	20.5
	15	266	126	811	4.3	0.8	6.2	28.7
As-measured Avg.		249	119	787	4.4	0.7	7.0	23.8
40 mph	4	234	88	770	4.4	0.5	5.6	17.2
1500 rpm	6	238	88	770	4.3	0.3	5.6	13.9
1/2 load**	10	234	100	783	4.3	0.7	6.8	18.8
	14	246	113	783	4.3	0.9	6.2	19.7
As-measured Avg.		238	97	777	4.3	0.6	6.1	17.4
Idle	2	304	189	270	1.3	1.6	12.4	27.9
Idle	8	294	202	259	1.2	1.6	12.4	27.0
Idle	11	312	241	281	1.2	1.6	10.6	27.9
Idle	13	312	228	270	1.2	1.8	9.3	32.8
As-measured Avg.		306	215	270	1.2	1.7	11.2	28.9

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* As ppm formaldehyde
** Engine operated at ½ fuel rate midway between maximum and no load fuel rate.

TABLE C-39. EXHAUST EMISSION SUMMARY

Vehicle: Bus 707
Date: November 9, 1972

Test Configuration: 60B Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	CO_2, %	Acrolein, ppm	Formaldehyde, ppm	Aliphatic* Aldehydes, ppm
24 mph	2	1568	279	897	4.6	2.0	5.6	23.9
900 rpm	7	1472	241	867	4.6	2.6	13.1	31.3
1/2 load**	10	1488	228	868	4.4	2.4	8.7	28.0
	13	1504	241	868	4.4	2.1	10.0	28.8
As-measured Avg.		1508	247	875	4.5	2.3	9.4	28.0
32 mph	1	1568	176	912	4.6	1.4	6.2	24.7
1200 rpm	5	1616	189	957	4.6	2.1	6.9	26.3
1/2 load**	12	1520	185	912	4.6	2.6	9.4	28.0
	16	1552	164	827	4.6	2.7	8.7	27.2
As-measured Avg.		1564	179	902	4.6	2.2	7.8	26.6
40 mph	4	1568	164	957	4.6	2.9	7.5	25.5
1500 rpm	6	1568	151	942	4.4	2.8	10.0	28.8
1/2 load**	9	1472	138	942	4.6	2.5	9.4	25.5
	15	1536	164	827	4.6	2.6	7.5	24.7
As-measured Avg.		1536	154	917	4.6	2.7	8.6	26.1
Idle	3	784	266	259	1.2	3.6	6.2	25.5
Idle	8	640	241	248	1.3	3.9	8.1	26.3
Idle	11	656	241	259	1.3	3.4	8.1	27.2
Idle	14	688	241	270	1.3	3.3	8.7	28.8
As-measured Avg.		692	247	259	1.3	3.6	7.8	27.0

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* As ppm formaldehyde

** Engine operated at fuel rate midway between maximum and no load fuel rate.

APPENDIX D

GASEOUS EMISSIONS, 13-MODE CYCLE

TABLE D-1. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/25/70 Test Miles: 1758 Test Configuration: 60LSN + Cat. Muff.
Bus: 702 Test Hours: 142 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C$_6$H$_{14}$, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C$_6$H$_{14}$ (weighted)	g/hr CO (weighted)	g/hr NO$_2$ (weighted)	OBSERVED bhp (weighted)
1	230	219	190	Idle	—	12.88	.07	12.95	2.62	4.93	4.63	—
2	[illegible]	[illegible]	147	1000	—	20.48	.18	20.66	5.66	7.41	9.67	—
3	261	119	417	"	22.5	21.45	.21	20.66	5.77	5.15	19.11	1.50
4	[illegible]	98	[illegible]	"	45.0	20.45	.30	[illegible]	5.77	4.10	[illegible]	3.61
5	[illegible]	98	549	"	67.5	20.30	.44	20.74	6.50	4.14	41.97	5.41
6	257	1419	1162	"	90	20.30	.61	20.91	6.56	62.43	74.56	[illegible]
7	[illegible]	113	[illegible]	Idle	—	[illegible]	.07	12.98	[illegible]	3.28	5.53	—
8	240	242	1120	1600	136	33.93	.75	34.68	8.76	17.66	[illegible]	10.88
9	196	98	747	"	102	33.80	.67	34.47	7.14	6.89	[illegible]	8.16
10	207	71	549	"	68	33.85	.50	34.35	7.57	5.13	[illegible]	5.44
11	219	98	343	"	34	33.90	.33	34.23	7.78	6.84	26.49	2.72
12	[illegible]	98	304	"	—	[illegible]	.36	34.36	7.74	6.96	[illegible]	—
13	[illegible]	143	240	Idle	—	12.85	.07	12.92	2.61	3.84	3.83	—
								TOTALS	76.12	140.10	399.14	[illegible]

RUN 2

MODE	C$_6$H$_{14}$, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C$_6$H$_{14}$ (weighted)	g/hr CO (weighted)	g/hr NO$_2$ (weighted)	OBSERVED bhp (weighted)
1	196	192	154	Idle	—	[illegible]	.07	12.77	2.24	4.39	3.76	—
2	219	242	143	1000	—	20.44	.18	20.57	4.76	10.40	6.64	—
3	230	119	370	"	22.5	20.40	.22	20.62	5.01	5.16	17.21	1.50
4	230	75	507	"	45.0	20.39	.30	20.69	5.02	4.14	33.66	3.60
5	233	98	808	"	67.5	20.35	.43	20.78	5.12	4.15	54.88	5.40
6	265	1206	1073	"	90.0	20.30	.52	20.82	5.86	52.90	71.11	7.20
7	196	143	218	Idle	—	12.38	.07	12.75	2.33	3.28	3.84	—
8	219	219	774	1600	136	33.92	.77	34.67	8.08	15.84	76.82	10.88
9	196	71	764	"	102	33.86	.66	34.52	7.14	5.16	[illegible]	8.16
10	196	71	549	"	68	[illegible]	.50	34.44	7.13	5.14	[illegible]	5.44
11	219	98	330		34	34.00	.33	34.33	7.54	6.86	22.96	2.72
12	219	98	291	"	—	34.09	.37	34.46	7.77	6.89	20.68	—
13	207	168	227	Idle	—	12.85	.07	12.92	2.35	3.81	3.52	—
								TOTALS	71.23	128.16	[illegible]	42.20

		RUN 1	RUN 2
g/hr C$_6$H$_{14}$ = 0.0152(ppm C$_6$H$_{14}$)(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.70	1.57
g/hr CO = 0.0265(ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.07	2.91
g/hr NO$_2$ = 0.0782(ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	9.79	[illegible]

TABLE D-2. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/30/70　　Test Miles: 1758　　Test Configuration: 60LSN + Stock Muff.
Bus: 702　　Test Hours: 142　　Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	288	217	178	Idle	—0—	12.90	.07	12.97	3.37	4.94	4.34	—0—
2	288	217	178	1000	—0—	20.50	.15	20.65	6.28	7.42	8.30	—0—
3	263	147	410	"	22.5	20.40	.21	20.61	5.72	6.20	17.06	1.80
4	253	95	577	"	45.0	20.38	.32	20.70	5.59	4.14	26.83	3.60
5	311	119	899	"	67.5	20.32	.45	20.77	6.72	5.00	42.03	5.40
6	369	1386	1146	"	90.0	20.29	.63	20.92	8.15	59.67	54.09	7.20
7	276	192	252	Idle	—0—	12.81	.07	12.88	3.15	4.34	6.10	—0—
8	288	217	1051	1600	136	34.10	.86	34.96	10.63	14.96	72.90	10.88
9	255	95	772	"	102	34.10	.68	34.78	9.74	6.98	67.21	8.16
10	253	91	591	"	68	34.10	.49	34.59	9.24	5.17	46.12	5.44
11	265	95	383	"	34	34.20	.35	34.55	9.66	6.90	29.93	2.72
12	265	95	370	"	—0—	34.30	.36	34.66	9.70	6.93	28.92	—0—
13	311	167	245	Idle	—0—	12.30	.07	12.37	3.22	3.77	6.42	—0—
								TOTALS	91.37	139.62	424.21	47.20

RUN 2

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	276	217	166	Idle	—0—	12.90	.07	12.97	3.15	4.94	4.05	—0—
2	265	217	166	1000	—0—	20.50	.14	20.64	5.78	7.42	7.30	—0—
3	230	119	424	"	22.5	20.45	.21	20.66	5.02	5.18	17.76	1.80
4	242	95	599	"	45.0	20.45	.32	20.77	5.30	4.15	27.84	3.60
5	253	95	913	"	67.5	20.40	.45	20.85	5.57	4.17	42.74	5.40
6	322	1142	1179	"	90.0	20.40	.62	21.02	7.14	50.50	55.92	7.20
7	265	168	252	Idle	—0—	12.85	.07	12.92	3.01	3.81	6.16	—0—
8	276	192	1033	1600	136	34.15	.86	35.01	10.20	14.14	72.54	10.88
9	242	91	777	"	102	34.20	.67	34.87	8.91	5.21	70.57	8.16
10	242	91	605	"	68	34.25	.49	34.73	8.87	5.19	48.40	5.44
11	253	95	383	"	34	34.30	.33	34.63	9.26	6.92	31.72	2.72
12	242	95	370	"	—0—	34.30	.35	34.65	8.86	6.93	30.75	—0—
13	265	168	265	Idle	—0—	12.73	.17	12.90	3.01	3.80	6.42	—0—
								TOTALS	84.08	124.36	[illegible]	47.20

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152(ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	2.02	1.76
g/hr CO = 0.0265(ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.08	2.75
g/hr NO = 0.0282(ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	9.38	9.36

TABLE D-3. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 10/2/70 Test Miles: 1758 Test Configuration: 608 + Stock Muffler
Bus: 702 Test Hours: 142 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	gm C_6H_{14} (weighted)	gm CO (weighted)	gm NO (weighted)	OBSERVED bhp (weighted)
1	760	237	202	Idle	—0—	12.88	.07	12.95	8.66	5.38	4.92	—0—
2	1174	314	178	1000	—0—	20.80	.13	20.93	25.57	15.63	8.57	—0—
3	1965	237	370	"	24.5	20.50	.25	20.75	40.96	10.34	17.11	1.96
4	1934	221	648	"	49	20.80	.37	20.97	42.63	9.70	26.87	3.92
5	1773	732	958	"	73.5	20.40	.54	21.02	39.35	32.38	43.43	5.88
6	1634	3437	1081	"	98	20.44	.68	21.12	36.44	152.73	50.03	7.84
7	668	221	215	Idle	—0—	12.84	.07	12.91	7.57	5.00	5.22	—0—
8	1450	768	1035	1600	143	34.10	.95	35.05	9.10	56.64	81.84	11.44
9	1611	176	822	"	107	34.10	.75	34.85	33.67	12.90	66.78	8.56
10	1611	176	838	"	71.5	34.20	.55	34.75	37.12	12.87	41.94	5.72
11	1800	237	317	"	36	34.30	.37	34.67	61.70	17.47	24.77	2.88
12	1750	237	304	"	—0—	34.70	.36	34.66	64.05	19.38	23.77	—0—
13	656	221	215	Idle	—0—	12.80	.07	12.87	7.43	4.77	5.20	—0—
								TOTALS	462.37	357.13	402.34	48.20

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	gm C_6H_{14} (weighted)	gm CO (weighted)	gm NO (weighted)	OBSERVED bhp (weighted)
1	622	237	166	Idle	—0—	12.94	.07	13.01	9.12	5.41	4.06	—0—
2	990	365	184	1000	—0—	20.60	.13	20.73	21.67	15.09	6.54	—0—
3	1727	237	313	"	24.5	20.60	.22	20.82	37.77	10.37	17.21	1.96
4	1727	206	591	"	49	20.50	.38	20.88	38.09	9.05	23.66	3.92
5	1542	741	945	"	73.5	20.40	.56	20.96	34.10	37.06	44.24	5.88
6	1473	3790	997	"	98	20.40	.68	21.08	32.28	168.10	47.04	7.84
7	577	206	237	Idle	—0—	12.84	.07	12.91	6.57	4.66	5.51	—0—
8	1312	404	1037	1600	143	34.10	.95	35.05	8.00	39.29	83.10	11.44
9	1470	191	897	"	107	34.10	.73	34.83	31.33	14.00	70.41	8.56
10	1417	176	835	"	71.5	34.20	.55	34.75	33.21	12.87	41.94	5.72
11	1588	221	317	"	36	34.30	.38	34.68	54.15	16.13	24.80	2.88
12	1534	221	304	"	—0—	34.10	.37	34.47	57.92	16.12	23.78	—0—
13	577	206	215	Idle	—0—	12.30	.07	12.37	6.78	4.65	5.20	—0—
								TOTALS	417.18	374.71	327.75	48.20

		RUN 1	RUN 2
gm C_6H_{14} = 0.0152 (ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, gm/bhp hr	9.55	8.65
gm CO = 0.0165 (ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, gm/bhp hr	7.38	7.73
gm NO = 0.0182 (ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, gm/bhp hr	8.37	8.35

TABLE D-4. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/11/70	Test Miles: 1073	Test Configuration: 60LSN + Cat. Muff.
Bus: 704	Test Hours: 98	Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	180	168	215	Idle	—0—	12.88	.07	12.95	2.10	3.82	5.24	—0—
2	196	172	166	1000	—0—	20.38	.15	20.53	4.55	8.30	7.67	—0—
3	196	143	278	"	24	20.37	.20	20.57	4.26	6.19	12.90	1.92
4	207	95	577	"	49	20.35	.34	20.69	4.52	4.14	26.94	3.92
5	219	119	882	"	74	20.30	.48	20.78	4.81	5.20	41.34	5.92
6	276	2021	1098	"	98	20.30	.68	20.98	6.11	81.26	51.97	7.84
7	158	168	215	Idle	—0—	12.88	.07	12.95	1.57	3.82	5.24	—0—
8	184	393	943	1600	146	33.58	.92	34.50	6.70	28.83	73.37	11.68
9	161	95	749	"	110	33.62	.75	34.37	5.84	6.97	58.08	8.80
10	178	71	498	"	73	33.68	.52	34.20	6.45	5.11	38.04	5.84
11	184	95	304	"	36	33.81	.34	34.15	6.65	6.82	23.42	2.88
12	184	95	387	"	—0—	34.10	.40	34.50	6.70	6.90	29.78	—0—
13	173	168	215	Idle	—0—	12.84	.07	12.91	1.97	3.80	5.22	—0—
								TOTALS	61.71	178.76	377.38	48.80

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	161	192	190	Idle	—0—	12.84	.07	12.91	1.83	4.38	4.62	—0—
2	173	192	202	1000	—0—	20.24	.17	20.41	3.73	8.25	7.30	—0—
3	184	168	320	"	24	20.24	.21	20.45	3.88	7.23	15.33	1.92
4	184	95	619	"	49	20.22	.34	20.56	3.99	4.11	28.91	3.92
5	184	119	928	"	74	20.20	.48	20.68	4.02	5.18	43.30	5.92
6	219	2308	1180	"	98	20.16	.68	20.84	4.78	104.70	55.13	7.84
7	127	143	240	Idle	—0—	12.84	.07	12.91	1.44	3.24	5.83	—0—
8	161	398	994	1600	146	33.52	.95	34.47	5.86	28.50	78.84	11.68
9	138	95	942	"	110	33.67	.72	34.39	5.01	6.89	58.11	8.80
10	150	71	498	"	73	33.91	.52	34.43	5.46	5.14	38.50	5.84
11	161	95	304	"	36	34.00	.33	34.33	5.84	6.96	23.04	2.88
12	173	95	387	"	—0—	34.11	.40	34.51	6.30	6.90	29.77	—0—
13	161	168	237	Idle	—0—	12.70	.07	12.77	1.83	3.20	5.80	—0—
								TOTALS	54.11	195.19	379.09	48.80

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0155 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.26	1.10
g/hr CO = 0.0265 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.66	3.99
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.73	7.77

TABLE D-5. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/16/70	Test Miles: 1073	Test Configuration: 60LSN + Stock Muff.
Bus: 704	Test Hours: 98	Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	219	217	252	Idle	0	12.92	.07	12.99	1.53	4.94	6.15	0
2	230	266	190	1000	0	20.60	.14	20.74	3.09	11.61	7.77	0
3	184	119	458	"	24	20.37	.21	20.57	4.04	5.21	20.54	1.72
4	173	95	677	"	49	20.37	.35	20.73	3.82	4.18	31.77	3.92
5	209	192	1020	"	74	20.25	.48	21.06	4.60	8.20	47.96	5.72
6	288	3939	1057	"	98	20.45	.67	21.12	6.42	174.77	50.08	7.84
7	173	168	252	Idle	0	12.85	.07	12.93	1.64	3.28	6.14	0
8	196	457	1051	1600	146	34.10	.95	35.05	7.26	36.65	83.10	11.68
9	184	91	867	"	110	34.18	.72	34.77	6.78	5.21	67.01	8.80
10	173	71	591	"	73	34.20	.52	34.72	6.34	5.18	46.30	5.74
11	173	71	343	"	36	34.25	.35	34.60	6.32	5.19	26.78	
12	173	95	357	"	0	34.30	.41	34.71	6.34	7.64	27.95	0
13	173	167	252	Idle	0	12.84	.07	12.91	1.77	3.20	6.12	0
								TOTALS	67.02	298.70	430.67	47.80

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	219	217	240	Idle	0	12.92	.07	12.99	1.53	4.94	5.86	0
2	230	266	190	1000	0	20.60	.15	20.75	3.09	11.62	7.70	0
3	184	143	817	"	24	20.58	.21	20.79	4.04	6.86	18.62	1.96
4	196	95	634	"	49	20.56	.35	20.91	4.33	4.18	27.91	3.92
5	219	143	974	"	74	20.70	.49	21.19	4.85	6.31	46.10	5.92
6	276	3376	1035	"	98	20.40	.67	21.07	6.14	148.66	49.80	7.84
7	207	192	240	Idle	0	12.38	.07	12.45	1.38	4.36	5.74	0
8	219	445	959	1600	146	34.10	.95	35.05	8.10	34.88	78.30	11.68
9	196	71	825	"	110	34.15	.72	34.87	7.22	5.21	64.74	8.80
10	196	71	599	"	73	34.20	.52	34.72	7.18	5.18	45.17	5.74
11	196	71	357	"	36	34.25	.35	34.60	7.16	5.17	27.16	2.88
12	196	95	387	"	0	34.30	.41	34.71	7.18	7.64	29.95	0
13	207	143	240	Idle	0	12.84	.07	12.91	2.32	3.24	5.83	0
								TOTALS	72.04	268.57	414.19	47.80

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.42	1.50
g/hr CO = 0.0265 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	5.72	5.09
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	8.83	8.47

TABLE D-6. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/18/70 **Test Miles:** 1075 **Test Configuration:** 608 + Stock Muffler
Bus: 704 **Test Hours:** 98 **Fuel:** EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_xH_y, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	Gm/hr C_xH_y (weighted)	Gm/hr CO (weighted)	Gm/hr NO (weighted)	OBSERVED bhp (weighted)
1	781	.217	166	Idle	—	12.90	.07	12.97	10.02	4.70	4.05	—
2	1538	.256	143	1000	—	20.40	.18	20.58	29.47	12.62	6.63	—
3	1565	.217	265	"	25	20.50	.26	20.76	34.24	9.46	12.38	2.00
4	1934	.217	535	"	51	20.50	.37	20.87	42.62	9.53	25.19	4.08
5	1780	.292	723	"	73	20.45	.52	20.97	38.73	12.88	38.74	5.84
6	1738	4343	728	"	102	20.43	.72	21.15	38.72	172.26	46.28	8.16
7	898	.192	202	Idle	—	12.80	.07	12.87	10.18	4.34	4.89	—
8	1404	1.78	978	1600	150	34.10	1.00	35.10	52.04	123.98	97.13	12.00
9	1495	.168	617	"	102	34.10	.67	34.77	54.58	12.90	48.19	8.16
10	1462	.168	431	"	75	34.16	.56	34.72	53.60	12.87	33.33	6.00
11	1667	.192	317	"	38	34.16	.38	34.54	60.87	13.95	24.70	3.04
12	1508	.192	278	"	—	34.18	.37	34.55	55.04	13.96	21.67	—
13	748	.192	190	Idle	—	12.80	.07	12.87	8.48	4.34	4.60	—
								TOTALS	488.17	428.77	348.37	49.28

RUN 2

MODE	C_xH_y, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	Gm/hr C_xH_y (weighted)	Gm/hr CO (weighted)	Gm/hr NO (weighted)	OBSERVED bhp (weighted)
1	760	.217	190	Idle	—	12.80	.07	12.87	8.61	4.70	4.60	—
2	1105	.217	184	1000	—	20.40	.17	20.57	24.00	13.74	7.14	—
3	1450	.217	343	"	25	20.50	.23	20.73	31.74	9.46	16.09	2.00
4	1599	.217	535	"	51	20.50	.37	20.87	35.00	9.53	25.19	4.08
5	1450	.293	822	"	73	20.45	.52	20.97	32.11	17.34	40.30	5.84
6	1450	4037	928	"	102	20.43	.72	21.15	32.38	177.65	46.28	8.16
7	755	.192	202	Idle	—	12.80	.07	12.87	8.55	4.34	4.89	—
8	1245	1.518	1038	1600	150	34.18	1.00	35.18	46.18	112.14	98.14	12.00
9	1312	.143	590	"	102	34.10	.67	34.77	48.20	10.46	46.80	8.16
10	1301	.143	477	"	75	34.16	.56	34.72	47.75	10.45	37.02	6.00
11	1430	.168	343	"	38	34.20	.38	34.58	52.75	12.24	26.76	3.04
12	1450	.192	304	"	—	34.28	.37	34.65	53.06	14.00	23.76	—
13	714	.168	202	Idle	—	12.80	.07	12.87	8.07	3.80	4.89	—
								TOTALS	428.64	402.03	363.91	49.28

		RUN 1	RUN 2
Gm/hr C_xH_y = 0.0152 (ppm C_xH_y)(Exh. Flow, lb/min)(Weight Factor)	BSHC, Gm/bhp hr	9.94	8.69
Gm/hr CO = 0.0153 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, Gm/bhp hr	8.68	8.16
Gm/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, Gm/bhp hr	7.07	7.38

TABLE D-7. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 8/28/70　　Test Miles: 911　　Test Configuration: 601.8N + Cat. Muff.
Bus: 707　　Test Hours: 99　　Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	129	119	223	Idle	0	12.94	.08	12.98	1.95	2.69	8.88	0
2	118	119	252	1000	0	20.76	.13	20.47	2.49	5.13	11.64	0
3	127	91	479	"	26	20.33	.22	20.55	2.76	3.07	22.21	2.08
4	138	91	733	"	51	20.34	.33	20.67	3.02	3.09	34.27	4.08
5	184	217	1271	"	76	20.30	.50	20.80	3.75	7.29	58.67	6.08
6	161	3671	1163	"	101	20.30	.72	21.02	3.58	161.49	55.15	8.08
7	104	91	304	Idle	0	12.30	.08	12.38	1.18	2.15	7.36	0
8	72	603	1262	1600	156	33.75	1.00	34.75	3.38	44.09	98.94	12.48
9	72	91	1081	"	117	33.78	.77	34.55	3.36	5.16	81.98	9.36
10	82	47	706	"	78	33.81	.53	34.34	3.34	3.34	54.70	6.24
11	173	47	438	"	39	33.83	.33	34.16	6.84	3.38	33.78	3.12
12	118	91	438	"	0	33.85	.42	34.27	4.16	5.16	33.86	0
13	127	75	330	Idle	0	12.80	.08	12.88	1.84	2.15	8.00	0
								TOTALS	40.55	249.18	505.67	51.52

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	115	75	317	Idle	0	12.10	.08	12.18	1.31	2.15	7.68	0
2	138	119	252	1000	0	20.34	.13	20.47	2.98	5.11	11.62	0
3	150	91	535	"	26	20.33	.22	20.55	3.24	3.07	24.80	2.08
4	127	91	778	"	51	20.34	.33	20.67	2.78	3.09	36.38	4.08
5	164	192	1346	"	76	20.30	.50	20.80	3.59	6.22	61.77	6.08
6	140	3028	1229	"	101	20.30	.72	21.02	3.10	133.76	57.83	8.08
7	79	91	327	Idle	0	12.30	.08	12.38	1.10	1.61	8.65	0
8	81	550	1416	1600	156	33.75	1.00	34.75	2.98	40.22	111.02	12.48
9	91	91	1136	"	117	33.78	.77	34.55	3.85	5.16	85.22	9.36
10	115	47	448	"	78	33.81	.53	34.34	4.17	3.34	41.47	6.24
11					39	33.83	.33	34.16	6.24	3.38	33.78	3.12
12	161	91	451	"	0	33.85	.40	34.25	7.18	5.31	43.98	0
13	112	75	240	Idle	0	12.80	.08	12.88	1.31	2.15	5.84	0
								TOTALS	42.86	217.78	555.01	51.52

g/hr C_6H_{14} = 0.0155(ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)
g/hr CO = 0.0265(ppm CO)(Exh. Flow, lb/min)(Weight Factor)
g/hr NO = 0.0782(ppm NO)(Exh. Flow, lb/min)(Weight Factor)

	RUN 1	RUN 2
BSHC, g/bhp hr	0.78	0.83
BSCO, g/bhp hr	4.85	4.22
BSNO, g/bhp hr	9.81	10.77

TABLE D-5. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/2/70 Test Miles: 911 Test Configuration: 60LSN + Stock Muff.
Bus: 707 Test Hours: 99 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	gm/hr C_6H_{14} (weighted)	gm/hr CO (weighted)	gm/hr NO (weighted)	OBSERVED bhp (weighted)
1	161	143	261	Idle	0	12.14	.08	12.22	1.83	3.26	6.44	0
2	173	148	240	1000	0	20.35	.13	20.48	3.74	6.16	11.09	0
3	178	95	428	"	26	20.34	.22	20.56	3.76	4.11	20.31	1.08
4	161	95	691	"	51	20.33	.34	20.67	3.51	4.13	32.22	4.08
5	184	143	1114	"	76	20.32	.51	20.83	4.08	6.44	52.35	6.08
6	230	4999	1146	"	101	20.30	.72	21.02	5.10	221.07	54.54	8.08
7	161	143	291	Idle	0	12.20	.08	12.28	1.83	3.23	7.05	0
8	184	467	1242	1600	126	33.76	1.00	34.76	6.78	26.10	99.77	15.48
9	150	95	1035	"	117	33.78	.77	34.55	5.47	6.70	90.67	9.76
10	152	71	605	"	88	33.32	.52	34.72	5.00	5.13	46.84	6.84
11	150	95	330	"	29	33.83	.33	34.16	5.41	6.82	25.43	3.12
12	150	71	424	"	0	33.86	.41	34.27	5.43	5.12	32.78	0
13	161	143	298	Idle	0	12.80	.08	12.88	1.83	3.23	6.74	0
								TOTALS	53.71	331.32	490.13	51.56

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	gm/hr C_6H_{14} (weighted)	gm/hr CO (weighted)	gm/hr NO (weighted)	OBSERVED bhp (weighted)
1	161	167	238	Idle	0	12.84	.08	12.92	1.83	3.78	5.54	0
2	173	143	318	1000	0	20.31	.15	20.46	3.74	6.16	7.92	0
3	178	95	477	"	26	20.32	.23	20.55	3.75	4.10	22.21	1.08
4	173	71	677	"	51	20.30	.37	20.67	3.73	3.07	31.57	4.08
5	184	119	1114	"	76	20.30	.50	20.80	4.00	5.21	52.27	6.08
6	196	4942	1130	"	101	20.30	.72	21.02	4.35	218.57	53.88	8.08
7	150	143	291	Idle	0	12.61	.08	12.71	1.70	3.24	7.06	0
8	173	453	1277	1600	126	33.79	1.00	34.79	6.35	60.51	100.15	15.48
9	150	71	1047	"	117	33.78	.77	34.55	5.45	[illegible]	21.13	[illegible]
10	138	47	644	"	88	33.70	.52	34.22	5.00	3.37	50.19	6.84
11	138	71	357	"	39	33.82	.33	34.15	4.77	5.10	27.30	3.12
12	138	71	307	"	0	33.86	.40	34.26	4.87	5.11	24.50	0
13	150	117	240	Idle	0	12.80	.08	12.88	1.70	2.67	5.56	0
								TOTALS	51.66	322.80	408.84	51.56

		RUN 1	RUN 2
gm/hr C_6H_{14} = 0.0152(ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, gm/bhp hr	1.04	1.00
gm/hr CO = 0.0763(ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, gm/bhp hr	2.88	4.56
gm/hr NO = 0.0782(ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, gm/bhp hr	7.04	7.17

TABLE D-9. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 9/4/70
Bus: 707

Test Miles: 911
Test Hours: 99

Test Configuration: 60S + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	760	168	178	Idle	0	12.88	.07	12.95	8.66	3.88	2.34	0
2	1013	168	178	1000	0	20.38	.13	20.51	21.34	7.25	8.34	0
3	1993	143	481	"	26	20.37	.23	20.60	38.57	6.30	20.96	2.08
4	1565	143	648	"	52	20.34	.37	20.71	34.52	6.23	30.27	4.16
5	1519	242	994	"	78	20.33	.53	20.85	33.96	10.46	45.15	6.24
6	1727	3538	1100	"	103	20.16	.73	20.89	38.10	153.53	51.34	8.24
7	760	143	325	Idle	0	12.84	.07	12.91	8.64	3.04	5.28	0
8	1417	1174	1179	1600	157	33.96	.86	33.82	50.96	93.40	89.96	12.56
9	1404	143	898	"	117	33.78	.80	33.96	50.20	10.19	65.60	9.36
10	1389	119	577	"	78	33.92	.55	34.37	47.78	8.61	46.74	6.24
11	1598	143	317	"	39	33.13	.38	34.21	57.37	10.27	24.47	3.12
12	1657	143	387	"	0	33.86	.42	34.28	58.98	10.31	27.61	0
13	737	143	202	Idle	0	12.84	.07	12.91	8.41	3.08	4.13	0
								TOTALS				

RUN 2

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	671	168	166	Idle	0	12.84	.08	12.92	7.56	3.81	2.09	0
2	944	168	166	1000	0	20.33	.08	20.41	20.42	7.24	7.67	0
3	1791	143	487	"	26	20.25	.23	20.48	37.96	6.16	20.34	2.08
4	1404	143	648	"	52	20.23	.38	20.61	30.26	6.20	30.13	4.16
5	1381	192	1035	"	78	20.10	.51	20.61	30.06	8.33	48.15	6.24
6	1450	3741	1163	"	103	20.14	.72	20.86	31.94	163.58	54.13	8.24
7	658	143	315	Idle	0	12.80	.08	12.88	7.38	3.13	5.21	0
8	1577	1053	1228	1600	157	33.77	1.03	34.80	47.67	79.10	96.41	12.56
9	1170	143	965	"	117	33.75	.80	34.55	41.67	10.40	67.43	9.36
10	1103	119	591	"	78	33.80	.57	34.37	40.11	8.61	45.33	6.24
11	1404	143	317	"	39	33.92	.38	34.30	50.71	10.27	24.46	3.12
12	1427	143	390	"	0	33.88	.40	34.29	51.64	10.31	29.61	0
13	588	143	312	Idle	0	12.80	.08	12.88	7.36	3.26	5.21	0
								TOTALS	399.43	323.32	438.68	52.00

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0155 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	8.50	7.68
g/hr CO = 0.0265 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	6.18	6.22
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	8.17	8.43

TABLE D-10. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/26/71 Test Miles: 44,962 Test Configuration: 60LSN + Cat. Muff.
Bus: 708 Test Hours: 1751 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	$C_1H_{1.85}$, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr $C_1H_{1.85}$ (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	180	182	145	Idle	0	12.84	.06	12.90	1.71	3.46	3.30	0
2	180	165	166	1000	0	20.35	.13	20.48	3.24	7.11	7.15	0
3	163	88	326	"	21	20.36	.19	20.55	3.54	3.80	14.10	1.68
4	188	63	475	"	49	20.38	.34	20.72	4.11	2.75	20.71	3.92
5	225	216	771	"	72	20.39	.47	20.86	5.24	9.48	33.94	5.76
6	237	2,299	890	"	90	20.30	.60	20.90	5.25	100.13	38.26	7.20
7	188	139	176	Idle	0	12.80	.05	12.85	1.70	3.15	3.99	0
8	200	359	813	1600	126	33.93	.71	34.64	7.31	26.16	57.25	10.08
9	150	50	625	"	94	33.55	.63	34.18	5.41	3.60	44.95	7.52
10	150	28	440	"	62	33.83	.46	34.29	5.43	1.50	31.74	4.96
11	150	28	303	"	30	34.10	.31	34.41	5.45	2.75	21.94	2.40
12	150	28	314	"	0	34.10	.33	34.43	5.45	2.75	22.76	0
13	163	88	171	Idle	0	12.80	.03	12.83	1.55	1.99	4.21	0
								TOTALS	55.67	168.93	306.19	43.52

RUN 2

Mode	$C_1H_{1.85}$, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr $C_1H_{1.85}$ (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	185	139	145	Idle	0	12.80	.06	12.86	1.71	3.18	3.29	0
2	180	165	196	1000	0	20.30	.12	20.42	3.24	4.09	9.57	0
3	175	187	348	"	24	20.31	.20	20.51	2.79	4.26	15.02	1.92
4	188	88	498	"	48	20.32	.33	20.65	4.10	3.82	21.75	3.84
5	228	229	741	"	75	20.35	.47	20.82	5.23	10.03	36.84	6.00
6	235	2499	897	"	90	20.38	.60	20.98	5.26	107.09	37.89	7.20
7	163	126	176	Idle	0	12.80	.05	12.85	1.55	2.75	4.21	0
8	200	375	813	1600	128	33.84	.80	34.65	7.31	29.18	57.24	10.24
9	150	67	687	"	93	33.53	.64	34.17	5.41	4.53	46.80	7.44
10	150	31	464	"	61	33.83	.46	34.29	5.42	2.74	32.49	4.88
11	150	63	314	"	30	34.10	.31	34.41	5.45	4.56	22.75	2.40
12	150	50	314	"	0	34.10	.33	34.43	5.45	3.67	22.75	0
13	163	126	176	Idle	0	12.80	.03	12.83	1.55	2.85	3.98	0
								TOTALS	56.08	185.86	317.21	43.63

Formula		RUN 1	RUN 2
g/hr $C_1H_{1.85}$ = 0.0132 (ppm $C_1H_{1.85}$)(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.28	1.29
g/hr CO = 0.0263 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.88	4.26
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.04	7.27

TABLE D-11. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/29/71 Test Miles: 22,962 Test Configuration: 60LSN + Stock Muff.
Bus: 703 Test Hours: 1721 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	150	139	135	Idle	—0—	12.88	.08	12.93	1.17	3.17	3.30	—0—
2	138	165	156	1000	—0—	20.35	.10	20.45	2.78	4.10	7.20	—0—
3	155	76	310	"	23	20.15	.20	20.35	2.71	3.29	14.56	1.74
4	138	80	418	"	44	20.36	.31	20.67	2.01	2.17	23.15	3.52
5	200	168	771	"	73	20.11	.48	20.59	4.41	7.25	36.20	5.74
6	200	2113	886	"	90	20.35	.60	20.15	4.45	93.14	40.46	7.20
7	150	114	186	Idle	—0—	12.34	.08	12.77	1.11	2.59	3.80	—0—
8	175	546	730	1600	136	34.10	.88	35.12	6.47	25.49	57.67	10.88
9	180	28	649	"	98	34.10	.65	34.75	5.50	1.93	43.04	7.84
10	138	13	428	"	72	34.10	.51	34.61	5.04	0.96	33.42	5.76
11	125	25	271	"	34	34.10	.33	34.43	4.54	1.81	21.05	2.72
12	125	25	292	"	—0—	34.10	.36	34.36	[illegible]	1.52	22.77	—0—
13	150	101	156	Idle	—0—	12.30	.05	12.35	1.70	2.29	3.79	—0—
								TOTALS	48.77	152.70	307.51	45.88

RUN 2

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	155	139	135	Idle	—0—	12.90	.08	12.97	2.14	3.16	3.57	—0—
2	158	168	148	1000	—0—	20.30	.10	20.40	4.05	4.09	6.67	—0—
3	163	58	248	"	23	20.38	.20	22.58	3.53	2.80	16.07	1.74
4	195	80	212	"	44	20.34	.31	22.15	3.31	2.17	25.52	3.52
5	213	190	758	"	73	20.35	.48	[illegible]	4.61	4.52	35.59	[illegible]
6	225	2178	899	"	90	20.38	.60	[illegible]	4.97	95.91	42.45	7.20
7	188	114	166	Idle	—0—	12.80	.08	12.86	2.14	2.58	4.03	—0—
8	225	393	788	1600	136	34.10	.88	34.98	9.31	17.49	61.96	10.88
9	178	38	586	"	98	34.10	.65	34.75	6.42	1.98	45.94	7.84
10	150	15	448	"	72	34.10	.51	34.61	5.41	1.52	24.56	5.76
11	150	38	292	"	41	34.20	.36	34.56	5.47	3.16	22.77	3.17
12	150	25	314	"	—0—	34.28	.36	34.58	5.15	1.81	24.50	—0—
13	175	15	166	Idle	—0—	12.50	.05	12.55	1.99	1.77	4.03	—0—
								TOTALS	57.47	161.45	325.58	41.1

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(Exh Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.07	1.27
g/hr CO = 0.0763 (ppm CO)(Exh Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.36	3.87
g/hr NO = 0.0782 (ppm NO)(Exh Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.80	7.06

TABLE D-13. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/30/71
Bus: 701

Test Miles: 22,962
Test Hours: 1721

Test Configuration: 608 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED rpm	OBSERVED POWER bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	1013	190	145	Idle	—0—	12.80	.06	12.86	11.52	4.31	3.82	—0—
2	1375	229	186	1000	—0—	20.30	.14	20.44	47.68	9.85	8.00	—0—
3	2375	198	326	"	21	20.32	.20	20.52	81.46	7.69	14.07	1.68
4	2900	152	500	"	49	20.34	.35	20.69	63.36	6.62	21.77	3.92
5	2425	281	799	"	69	20.35	.47	20.82	53.32	12.31	35.00	5.52
6	2225	3603	899	"	97	20.30	.67	20.97	49.27	158.97	39.66	7.76
7	950	152	166	Idle	—0—	12.80	.05	12.85	10.80	3.44	3.76	—0—
8	1930	465	944	1600	148	34.10	.99	35.09	92.26	34.33	69.69	11.84
9	2275	114	717	"	106	34.12	.72	34.84	83.70	8.36	52.56	8.48
10	2275	101	500	"	73	34.00	.55	34.55	83.00	7.34	36.35	5.84
11	2650	139	303	"	38	34.00	.38	34.38	96.21	10.05	21.92	3.04
12	2800	139	326	"	—0—	34.00	.40	34.40	101.71	10.06	23.60	—0—
13	950	139	176	Idle	—0—	12.80	.05	12.85	10.12	3.15	3.99	—0—
								TOTALS	771.41	296.48	333.79	47.84

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	950	178	135	Idle	—0—	12.80	.06	12.86	10.30	4.03	3.06	—0—
2	1625	216	166	1000	—0—	20.33	.12	20.45	50.77	9.29	7.19	—0—
3	2375	165	314	"	24	20.32	.22	20.54	81.91	7.13	13.87	1.92
4	2900	152	497	"	48	20.33	.35	20.68	63.33	6.61	21.19	3.84
5	2390	268	795	"	73	20.32	.50	20.82	52.22	11.71	34.39	5.84
6	2165	3427	899	"	97	20.33	.66	20.99	47.91	151.35	39.70	7.76
7	950	190	166	Idle	—0—	12.80	.05	12.85	10.80	4.30	3.76	—0—
8	1900	465	914	1600	145	34.12	.97	35.09	90.40	34.33	67.48	11.60
9	2165	126	703	"	106	34.10	.72	34.82	79.68	9.24	51.98	8.48
10	2225	101	475	"	72	34.10	.54	34.64	81.39	7.36	34.62	5.76
11	2575	139	292	"	35	34.10	.36	34.46	93.70	10.08	21.17	[illegible]
12	2730	126	302	"	—0—	34.10	.38	34.48	101.13	9.14	21.98	—0—
13	900	166	156	Idle	—0—	12.80	.05	12.85	10.33	2.85	3.93	—0—
								TOTALS	763.75	267.48	325.14	47.60

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152(ppm C_6H_{14})(exh. flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	16.10	16.04
g/hr CO = 0.0165(ppm CO)(exh. flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	5.75	5.57
g/hr NO = 0.0782(ppm NO)(exh. flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.94	6.73

TABLE D-13. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/13/71 Test Miles: 25,193 Test Configuration: 6OLSN + Cat. Muff.
Bus: 704 Test Hours: 2063 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_nH_{2n}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	Wt C_nH_{2n} (weighted)	Wt CO (weighted)	Wt NO (weighted)	OBSERVED bhp (weighted)
1	225	203	196	Idle	0	12.86	.05	12.91	2.59	4.62	8.29	0
2	250	177	196	1000	0	20.35	.13	20.48	5.41	7.63	8.59	0
3	275	126	348	"	25	20.35	.22	20.57	5.99	5.46	16.16	2.00
4	300	113	561	"	48	20.36	.33	20.69	6.55	4.92	26.19	3.94
5	362	268	929	"	78	20.37	.52	20.89	7.99	11.78	43.78	6.24
6	397	3495	856	"	91	20.35	.65	21.00	8.58	153.98	40.55	7.28
7	225	165	196	Idle	0	12.86	.07	12.93	2.57	3.76	4.79	0
8	325	845	943	1600	141	33.37	.92	34.29	11.77	37.32	72.75	11.28
9	262	101	771	"	110	33.37	.72	34.09	9.43	7.34	59.30	8.80
10	225	63	536	"	73	33.65	.52	34.17	8.12	4.55	41.42	5.94
11	200	63	347	"	38	33.65	.35	34.00	7.19	4.51	26.62	3.04
12	200	75	349	"	0	33.64	.35	33.99	7.18	5.36	26.61	0
13	187	126	217	Idle	0	12.87	.07	12.94	2.14	2.97	5.31	0
								TOTALS	85.47	255.98	376.36	48.32

RUN 2

MODE	C_nH_{2n}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	Wt C_nH_{2n} (weighted)	Wt CO (weighted)	Wt NO (weighted)	OBSERVED bhp (weighted)
1	175	202	196	Idle	0	12.86	.07	12.93	2.00	4.63	4.30	0
2	200	202	196	1000	0	20.35	.13	20.48	5.62	8.75	8.59	0
3	225	126	393	"	25	20.36	.22	20.58	4.89	5.46	18.26	2.00
4	250	113	576	"	51	20.36	.35	20.71	5.47	4.92	27.38	4.08
5	300	333	979	"	78	20.37	.52	20.89	6.62	14.64	46.61	6.24
6	275	3212	914	"	91	20.35	.65	21.00	6.10	146.34	43.30	7.28
7	150	177	207	Idle	0	12.86	.05	12.91	1.71	4.03	5.05	0
8	250	532	943	1600	138	33.37	.90	34.27	9.05	38.36	72.91	11.04
9	225	113	777	"	110	33.37	.72	34.09	8.10	8.11	61.45	8.80
10	200	75	536	"	73	33.65	.52	34.17	7.22	5.39	41.32	5.84
11	175	101	348	"	38	33.65	.35	34.00	6.28	7.23	26.69	3.04
12	175	88	348	"	0	33.64	.35	33.99	6.28	6.29	26.69	0
13	175	151	217	Idle	0	12.87	.07	12.94	2.00	3.44	5.31	0
								TOTALS	69.34	258.29	387.88	47.33

		RUN 1	RUN 2
Wt C_nH_{2n} = 0.0152(ppm C_nH_2)(EXH FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.77	1.44
Wt CO = 0.0253(ppm CO)(EXH FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	5.30	5.23
Wt NO = 0.0782(ppm NO)(EXH FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.79	8.03

TABLE D-14. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/15/71 Test Miles: 25,193 Test Configuration: 6013N + Stock Muff.
Bus: 704 Test Hours: 2063 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	238	178	176	Idle	0	12.92	.05	12.97	3.26	4.07	4.31	0
2	213	178	186	1000	0	20.41	.15	20.56	4.62	7.70	8.65	0
3	200	76	428	"	29	20.42	.17	20.59	4.35	3.29	19.88	2.32
4	213	63	586	"	51	20.43	.17	20.60	4.63	2.73	27.23	4.08
5	250	255	1035	"	79	20.44	.18	20.62	5.44	11.06	48.15	6.32
6	338	3255	927	"	98	20.41	.22	20.63	7.36	141.29	43.14	7.84
7	250	139	197	Idle	0	12.92	.05	12.97	2.85	3.18	4.83	0
8	288	465	974	1600	140	33.92	.57	34.49	10.49	33.74	75.79	11.20
9	238	38	799	"	116	33.65	.58	34.23	8.60	2.74	61.70	9.28
10	213	25	536	"	75	33.92	.53	34.45	7.75	1.81	41.66	6.00
11	200	38	326	"	42	33.92	.48	34.40	7.27	2.75	25.30	3.36
12	188	38	303	"	0	33.92	.43	34.35	6.81	2.75	23.43	0
13	213	126	176	Idle	0	12.89	.05	12.94	2.44	2.87	4.30	0
								TOTALS	75.87	219.98	388.80	50.40

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	200	178	166	Idle	0	12.92	.05	12.97	2.29	4.07	4.07	0
2	200	190	176	1000	0	20.41	.15	20.56	4.34	8.22	8.16	0
3	200	88	393	"	25	20.42	.17	20.59	4.35	3.81	18.26	2.00
4	200	76	625	"	33	20.43	.18	20.61	4.35	3.30	29.06	2.64
5	250	255	1020	"	80	20.44	.22	20.66	5.45	11.08	47.54	6.40
6	288	3486	929	"	97	20.41	.23	20.64	6.28	151.37	43.26	7.76
7	213	139	176	Idle	0	12.92	.05	12.97	2.44	3.18	4.30	0
8	250	519	988	1600	141	33.92	.55	34.47	9.11	37.66	76.75	11.28
9	225	50	870	"	116	33.92	.57	34.49	8.19	3.63	67.69	9.28
10	200	10	549	"	78	33.94	.52	34.46	7.28	.74	42.68	6.24
11	175	38	337	"	41	33.92	.45	34.37	6.35	2.75	26.17	3.28
12	175	38	314	"	0	33.92	.43	34.35	6.35	2.75	24.33	0
13	188	139	176	Idle	0	12.86	.05	12.91	2.15	3.16	4.29	0
								TOTALS	71.80	235.94	396.55	48.88

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0132(ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.51	1.47
g/hr CO = 0.0263(ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	4.36	4.83
g/hr NO = 0.0282(ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.71	8.11

TABLE D-15. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/16/71	Test Miles: 25,193	Test Configuration: 608 + Stock Muffler
Bus: 704	Test Hours: 2063	Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO_2, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO_2 (weighted)	OBSERVED bhp (weighted)
1	1012	355	128	Idle	—0—	12.95	.05	13.00	11.64	5.84	3.07	—0—
2	1438	333	86	1000	—0—	20.44	.15	20.59	31.27	14.43	3.99	—0—
3	1950	190	314	"	30	20.45	.17	20.62	42.46	8.24	14.61	2.40
4	2500	152	512	"	57	20.46	.18	20.64	54.49	6.00	23.84	4.56
5	2175	320	827	"	81	20.47	.22	20.69	47.52	13.93	38.60	6.48
6	2150	4210	856	"	101	20.48	.25	20.73	47.07	183.62	40.03	8.08
7	900	190	156	Idle	—0—	12.95	.05	13.00	10.35	4.35	3.83	—0—
8	1995	1263	944	1600	157	33.67	.64	34.31	64.31	91.17	73.07	12.56
9	1962	101	703	"	110	33.69	.58	34.27	71.00	7.28	54.35	8.80
10	1938	76	487	"	81	33.98	.53	34.51	70.62	5.52	37.92	6.48
11	2162	126	292	"	46	33.98	.47	34.45	78.65	9.13	22.69	3.68
12	2125	126	282	"	—0—	33.97	.43	34.40	77.19	9.12	21.89	—0—
13	856	178	176	Idle	—0—	12.95	.05	13.00	7.77	4.08	4.32	—0—
								TOTALS	614.34	362.71	342.21	53.04

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO_2, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO_2 (weighted)	OBSERVED bhp (weighted)
1	950	258	135	Idle	—0—	12.95	.05	13.00	9.99	5.94	3.32	—0—
2	1575	307	176	1000	—0—	20.44	.15	20.59	29.90	13.30	8.18	—0—
3	1975	203	326	"	30	20.45	.17	20.62	43.01	8.81	15.17	2.40
4	2425	165	536	"	57	20.46	.18	20.64	52.86	7.19	24.96	4.56
5	2125	386	870	"	81	20.47	.22	20.69	46.45	16.80	40.61	6.48
6	2050	4210	888	"	101	20.48	.25	20.73	44.85	183.45	41.52	8.08
7	925	203	156	Idle	—0—	12.95	.05	13.00	9.48	4.65	3.93	—0—
8	1995	1366	974	1600	157	33.67	.60	34.27	64.24	98.49	75.30	12.56
9	1925	126	730	"	112	33.67	.58	34.25	69.62	9.08	56.41	8.96
10	1925	88	512	"	81	33.94	.53	34.47	70.07	6.38	37.92	6.49
11	2175	152	303	"	46	33.94	.47	34.41	77.83	11.00	23.52	3.68
12	2150	152	303	"	—0—	33.96	.43	34.39	78.04	11.00	23.51	—0—
13	850	178	176	Idle	—0—	12.95	.05	13.00	7.77	4.08	4.32	—0—
								TOTALS	603.08	380.05	360.30	53.20

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	11.62	11.41
g/hr CO = 0.0265 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	6.83	7.14
g/hr NO_2 = 0.0782 (ppm NO_2)(Exh. Flow, lb/min)(Weight Factor)	BSNO$_2$, g/bhp hr	6.45	6.77

TABLE D-16. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 3/29/71 Test Miles: 26,650 Test Configuration: 6V71N + Cat. Muff.
Bus: 707 Test Hours: 1971 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	189	139	218	Idle	—0—	12.89	.06	12.95	2.18	3.17	4.33	—0—
2	189	114	207	1000	0	20.35	.11	20.46	4.06	4.91	9.88	—0—
3	212	76	392	"	32	20.34	.25	20.59	4.61	2.59	17.74	2.56
4	212	76	612	"	60	20.33	.40	20.73	4.64	3.31	27.62	4.80
5	250	229	890	"	81	20.32	.46	20.78	5.49	10.01	40.79	6.48
6	275	4986	886	"	105	20.30	.70	21.00	6.10	220.31	40.85	8.40
7	138	114	228	Idle	—0—	12.86	.05	12.91	1.88	2.59	5.86	—0—
8	200	1103	1004	1600	146	33.76	.95	34.71	7.34	80.60	78.66	11.68
9	175	101	870	"	112	33.76	.73	34.49	6.37	7.33	67.69	8.96
10	162	88	861	"	72	33.78	.51	34.29	5.86	2.74	43.37	5.76
11	180	55	393	"	41	33.89	.36	34.25	5.43	1.90	30.37	3.28
12	138	55	389	"	—0—	33.76	.33	34.09	4.97	1.79	27.61	—0—
13	175	76	228	Idle	—0—	12.88	.03	12.91	2.00	1.73	5.56	—0—
								TOTALS	60.90	342.58	401.40	51.14

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	162	126	197	Idle	—0—	12.96	.03	12.99	2.33	2.88	4.73	—0—
2	162	126	218	1000	0	20.38	.11	20.49	3.81	5.42	10.08	—0—
3	175	101	408	"	35	20.41	.26	20.66	3.82	4.29	19.88	2.80
4	200	101	664	"	54	20.41	.36	20.78	4.38	4.41	31.08	4.32
5	225	229	994	"	83	20.51	.48	20.96	4.96	10.05	45.94	6.64
6	262	4883	944	"	105	20.37	.70	21.07	5.85	215.14	44.87	8.40
7	138	139	249	Idle	—0—	12.83	.05	12.88	1.57	3.15	6.06	—0—
8	175	988	1098	1600	146	33.76	.95	34.73	6.42	72.20	96.05	11.68
9	162	114	919	"	112	33.76	.73	34.49	5.90	8.27	71.14	8.96
10	138	76	579	"	72	33.78	.51	34.29	4.99	5.48	46.31	5.76
11	138	63	393	"	41	33.89	.36	34.25	4.99	4.54	30.57	3.28
12	138	76	389	"	—0—	33.76	.33	34.09	4.99	5.45	27.61	—0—
13	175	166	229	Idle	—0—	12.88	.03	12.91	2.00	2.87	6.07	—0—
								TOTALS	55.76	344.26	429.15	51.04

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0131 (ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.19	1.09
g/hr CO = 0.0263 (ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	6.70	6.74
g/hr NO = 0.0432 (ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.85	8.40

TABLE D-17. 13-MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/1/71
Bus: 707

Test Miles: 26,650
Test Hours: 1971

Test Configuration: 60LSN + Stock Muff.
Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	200	139	156	Idle	—0—	12.98	.05	13.03	2.30	3.19	3.74	—0—
2	188	139	186	1000	—0—	20.52	.30	20.82	4.15	6.09	9.74	—0—
3	188	88	390	"	22	20.50	.40	20.90	4.11	3.85	17.28	1.76
4	200	88	658	"	60	20.48	.40	20.88	4.41	3.87	29.44	4.80
5	237	320	999	"	76	20.45	.50	20.95	5.24	14.11	44.49	6.08
6	275	4789	901	"	100	20.42	.69	21.11	6.15	212.62	40.05	8.00
7	210	113	197	Idle	—0—	12.98	.05	13.03	2.30	2.59	4.95	—0—
8	328	1098	1004	1600	146	33.80	.95	34.75	8.26	76.40	78.91	11.68
9	200	76	881	"	110	33.92	.72	34.64	7.32	5.54	65.72	8.80
10	198	38	594	"	81	34.04	.57	34.61	6.40	2.77	44.82	6.48
11	162	38	348	"	41	34.15	.37	34.52	5.91	2.76	27.10	3.28
12	162	50	326	"	—0—	34.22	.35	34.57	5.91	3.64	25.42	—0—
13	212	101	207	Idle	—0—	12.98	.05	13.03	2.44	2.32	5.10	—0—
								TOTALS	64.96	339.73	392.56	50.88

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	212	88	176	Idle	—0—	12.98	.07	13.05	2.45	2.02	4.34	—0—
2	188	101	207	1000	—0—	20.52	.32	20.84	4.14	4.43	9.93	—0—
3	162	50	393	"	26	20.50	.22	20.72	3.54	2.18	19.37	2.05
4	162	50	612	"	54	20.48	.37	20.85	3.57	2.19	29.99	4.32
5	225	376	899	"	80	20.45	.53	20.98	4.98	17.04	42.85	6.40
6	237	4590	890	"	98	20.42	.67	21.10	5.28	203.77	41.81	7.84
7	188	88	207	Idle	—0—	12.98	.05	13.03	2.19	2.02	5.10	—0—
8	312	833	1004	1600	141	33.80	.92	34.72	7.77	60.95	78.64	11.28
9	188	50	827	"	127	33.92	.70	34.62	6.97	2.64	64.99	9.86
10	195	25	574	"	75	34.04	.53	34.57	6.59	1.82	44.77	6.00
11	162	25	390	"	38	34.15	.35	34.50	5.90	1.81	29.90	3.04
12	150	38	348	"	—0—	34.22	.35	34.57	5.48	2.76	27.14	—0—
13	200	63	218	Idle	—0—	12.98	.05	13.03	2.30	1.45	5.57	—0—
								TOTALS	60.84	305.98	399.60	[illegible]

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152(ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.27	1.22
g/hr CO = 0.0765(ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	6.67	6.17
g/hr NO = 0.0782(ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.73	8.06

TABLE D-18. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 4/3/71 Test Miles: 26,650 Test Configuration: 608 + Stock Muffler
Bus: 707 Test Hours: 1971 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	$C_1H_{1.85}$, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr $C_1H_{1.85}$ (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	838	190	166	Idle	0	12.98	.05	13.00	9.63	4.35	4.08	0
2	1288	203	197	1000	0	20.48	.16	20.60	26.65	8.80	9.16	0
3	2000	178	393	"	36	20.43	.27	20.70	43.72	7.78	18.55	2.56
4	1770	190	599	"	53	20.43	.38	20.81	38.46	8.32	28.12	4.24
5	1800	333	888	"	77	20.43	.53	20.96	39.34	14.67	41.88	6.16
6	1880	3662	948	"	97	20.43	.68	21.11	41.24	162.65	44.96	7.76
7	878	178	186	Idle	0	12.95	.04	12.99	10.05	4.07	4.67	0
8	1678	1078	1066	1600	150	34.10	1.01	35.11	62.10	79.34	84.44	12.00
9	1708	152	914	"	115	34.10	.78	34.88	63.62	11.15	64.05	9.20
10	1725	114	899	"	83	34.10	.60	34.70	63.21	8.32	46.89	6.64
11	2100	139	348	"	40	34.10	.39	34.49	78.31	10.09	27.08	3.20
12	2125	137	348	"	0	34.10	.37	34.47	77.25	10.08	27.06	0
13	900	178	197	Idle	0	12.96	.03	12.99	10.32	4.07	4.83	0
								TOTALS	567.51	333.68	405.59	51.76

RUN 2

Mode	$C_1H_{1.85}$, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr $C_1H_{1.85}$ (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	875	203	166	Idle	0	12.95	.04	12.99	10.05	4.65	4.07	0
2	1280	203	197	1000	0	20.48	.15	20.63	27.23	8.91	9.17	0
3	2025	178	416	"	31	20.43	.26	20.69	44.24	7.78	17.42	2.48
4	1775	198	612	"	56	20.43	.40	20.83	39.04	8.80	28.76	4.48
5	1812	320	885	"	73	20.43	.50	20.93	40.05	14.09	41.79	5.84
6	1865	3722	974	"	97	20.43	.68	21.11	40.68	165.51	46.39	7.72
7	875	198	197	Idle	0	12.95	.04	12.99	10.05	4.09	4.84	0
8	1650	1131	1082	1600	153	34.10	1.03	35.13	61.21	83.60	85.75	12.24
9	1688	152	914	"	119	34.10	.81	34.91	62.28	11.16	71.98	9.52
10	1675	114	612	"	80	34.10	.58	34.68	61.34	8.32	47.88	6.40
11	2125	186	390	"	42	34.10	.40	34.50	79.42	9.15	28.80	3.36
12	2100	139	357	"	0	34.10	.35	34.45	76.40	10.08	27.70	0
13	875	165	197	Idle	0	12.96	.03	12.99	10.04	3.77	4.83	0
								TOTALS	549.73	338.56	421.55	52.24

Formula	Quantity	RUN 1	RUN 2
g/hr $C_1H_{1.85}$ = 0.0152 (ppm C, C_1)(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	10.97	10.53
g/hr CO = 0.0263 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	6.45	6.48
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.84	8.07

TABLE D-19. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 8/16/71　　Test Miles: 45,706　　Test Configuration: LSN + Catalytic Muffler
Bus: 702　　Test Hours: 3,717　　Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	150	159	239	Idle	—	12.80	.06	12.86	1.71	3.15	5.81	—
2	150	152	186	1000	—	20.50	.13	20.63	3.37	6.60	8.66	—
3	188	76	382	"	26	20.30	.22	20.52	4.07	3.28	17.68	2.08
4	200	80	576	"	47	20.10	.34	20.44	4.32	3.15	27.02	3.92
5	250	396	856	"	72	20.30	.48	20.78	5.47	16.88	40.13	5.84
6	250	2,064	885	"	90	19.92	.60	20.52	5.42	89.11	40.97	7.20
7	150	114	282	Idle	—	12.80	.06	12.86	1.71	2.58	6.85	—
8	200	304	813	1600	122	33.83	.79	34.62	7.31	22.36	62.50	9.76
9	200	63	638	"	95	33.73	.63	34.36	7.36	4.55	49.46	7.60
10	150	38	485	"	65	34.10	.48	34.58	5.48	2.76	37.06	5.20
11	138	38	303	"	38	34.00	.35	34.35	5.01	2.75	23.48	3.04
12	138	50	314	"	—	34.00	.34	34.34	5.00	3.61	24.33	—
13	125	101	249	Idle	—	12.80	.05	12.85	1.42	2.29	6.85	—
								TOTALS	57.65	163.07	351.80	44.64

RUN 2

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	137	152	244	Idle	—	12.84	.07	12.91	1.58	3.46	6.07	—
2	138	178	186	1000	—	20.50	.13	20.63	3.01	7.73	8.66	—
3	175	101	359	"	26	20.30	.22	20.52	3.74	4.36	16.62	2.08
4	188	76	586	"	51	20.10	.35	20.45	4.06	3.27	27.04	4.08
5	225	320	827	"	72	20.30	.48	20.78	4.94	13.99	38.77	5.76
6	239	1944	914	"	90	19.96	.60	20.56	5.17	85.82	42.89	7.20
7	150	152	260	Idle	—	12.84	.07	12.91	1.71	3.46	6.34	—
8	188	281	827	1600	123	33.87	.90	34.37	6.82	20.32	64.12	7.84
9	162	76	638	"	93	33.84	.63	34.47	5.90	5.51	49.61	7.44
10	150	50	464	"	65	34.04	.48	34.52	5.47	3.63	36.14	5.20
11	150	63	314	"	38	34.04	.35	34.39	5.45	4.56	24.36	3.04
12	150	63	314	"	—	34.04	.35	34.39	5.45	4.56	24.35	—
13	138	136	260	Idle	—	12.86	.07	12.93	1.58	2.37	6.35	—
								TOTALS	54.93	163.54	350.82	42.64

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.29	[illegible]
g/hr CO = 0.0255 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.65	3.86
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.86	7.86

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TABLE D-20. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 8/18/71 Test Miles: 45,706 Test Configuration: LSN + Stock Muffler
Bus: 702 Test Hours: 3,717 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_xH_y, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	gm C_nH_m (weighted)	gm CO (weighted)	gm NO (weighted)	Observed bhp (weighted)
1	225	126	197	Idle	—	12.88	.07	12.95	2.58	2.38	4.82	—
2	213	165	185	1000	—	20.39	.16	20.55	4.62	9.15	6.72	—
3	200	101	392	"	21	20.39	.21	20.60	4.35	4.38	13.57	1.68
4	213	63	475	"	45	20.36	.33	20.69	4.65	3.74	22.19	3.60
5	263	139	703	"	67	20.36	.46	20.82	5.78	6.09	33.02	5.36
6	325	1886	841	"	90	19.92	.62	20.54	7.05	80.21	38.97	7.20
7	225	139	197	Idle	—	12.84	.07	12.91	2.57	3.16	4.81	—
8	288	281	958	1600	122	33.55	.83	34.38	10.46	20.33	58.79	9.76
9	238	58	861	"	90	33.83	.63	34.46	8.66	3.76	43.61	7.20
10	225	38	408	"	61	34.10	.49	34.59	8.22	2.77	31.60	4.88
11	213	50	249	"	28	34.10	.33	34.43	7.74	3.62	19.34	2.24
12	213	50	271	"	—	34.10	.35	34.45	7.75	3.62	21.06	—
13	218	126	186	Idle	—	12.84	.07	12.91	2.43	3.87	4.37	—
								TOTALS	76.86	142.26	303.02	41.92

RUN 2

Mode	C_xH_y, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	gm C_nH_m (weighted)	gm CO (weighted)	gm NO (weighted)	Observed bhp (weighted)
1	225	153	197	Idle	—	12.88	.07	12.95	2.58	3.49	4.82	—
2	200	178	166	1000	—	20.32	.15	20.47	4.32	7.67	7.67	—
3	200	114	318	"	21	20.36	.21	20.57	4.34	4.93	14.57	1.68
4	213	76	524	"	43	20.39	.33	20.72	4.66	3.31	24.49	3.44
5	250	139	744	"	67	20.32	.46	20.78	5.09	6.08	34.88	5.36
6	313	1858	899	"	89	20.31	.61	20.92	6.91	83.10	42.43	7.12
7	235	153	218	Idle	—	12.84	.07	12.91	2.57	3.46	5.12	—
8	275	251	799	1600	122	33.55	.83	34.38	9.98	20.33	61.99	9.76
9	213	80	599	"	83	33.83	.60	34.43	7.74	3.62	46.53	6.64
10	211	50	428	"	58	34.10	.48	34.58	7.78	3.64	33.39	4.64
11	213	63	291	"	24	33.83	.32	34.15	7.68	4.03	20.88	1.92
12	213	80	303	"	—	34.10	.35	34.45	7.75	3.62	23.55	—
13	225	126	218	Idle	—	12.80	.07	12.87	2.36	3.41	5.32	—
								TOTALS	74.36	151.17	335.82	40.56

		RUN 1	RUN 2
gm C_nH_m = 0.0152(ppm C_nH_m)(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.83	1.83
gm CO = 0.0265(ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	3.40	3.73
gm NO = 0.0782(ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.23	8.03

11.70

TABLE D-21. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 8/19/71 Test Miles: 45,706 Test Configuration: 608 + Stock Muffler
Bus: 702 Test Hours: 3,717 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	775	165	136	Idle	———	12.80	.10	12.90	8.14	1.75	4.33	———
2	1445	239	166	1000	———	20.30	.18	20.48	30.92	9.97	9.67	———
3	2225	173	303	"	26	20.30	.23	20.53	48.34	7.69	14.08	2.09
4	2900	139	477	"	54	20.10	.38	20.48	60.56	5.77	22.15	4.32
5	2600	307	730	"	75	20.10	.50	20.60	52.21	13.31	33.13	6.00
6	2100	3255	827	"	96	19.92	.67	20.59	42.66	141.01	37.48	9.29
7	750	139	207	Idle	———	12.80	.07	12.87	8.73	3.99	3.04	———
8	1975	627	956	1600	148	33.55	.95	34.50	91.95	45.87	44.23	11.2
9	2175	101	717	"	110	33.73	.75	34.48	92.19	7.53	33.99	8.36
10	2250	96	475	"	80	33.73	.58	34.31	81.52	5.47	36.99	6.40
11	2350	114	272	"	38	34.10	.39	34.49	103.99	4.89	1.94	3.74
12	2850	114	303	"	———	34.00	.40	34.40	103.73	8.82	[illegible]	———
13	775	114	207	Idle	———	12.80	.08	12.88	8.83	2.87	[illegible]	———
								TOTALS	[illegible]	243.23	235.97	48.22

RUN 2

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	795	152	186	Idle	———	12.80	.09	12.89	8.84	3.48	4.53	———
2	1480	229	166	1000	———	20.30	.15	20.45	31.21	7.55	7.66	———
3	2375	199	314	"	28	20.30	.24	20.54	51.51	7.61	14.82	2.19
4	2400	152	497	"	52	20.10	.38	20.48	62.92	6.58	23.30	4.16
5	2400	255	717	"	75	20.10	.50	20.60	52.81	11.05	33.32	6.00
6	2150	3312	941	"	95	19.92	.65	20.57	46.70	142.74	39.03	7.60
7	800	152	207	Idle	———	12.80	.07	12.87	7.11	3.43	3.14	———
8	1975	640	995	1600	139	33.55	.93	34.48	91.91	46.43	68.16	11.12
9	2150	126	709	"	107	33.73	.73	34.36	72.47	9.16	39.10	8.56
10	2250	88	500	"	72	34.10	.54	34.64	88.30	6.41	29.07	5.76
11	2750	126	303	"	42	34.10	.40	34.50	100.19	9.15	25.25	3.31
12	2750	126	303	"	———	34.10	.38	34.48	110.15	9.14	23.29	———
13	775	137	207	Idle	———	12.80	.08	12.88	8.83	3.15	3.04	———
								TOTALS	704.23	267.52	340.73	48.90

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(exh. flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	14.76	14.43
g/hr CO = 0.0263 (ppm CO)(exh. flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	5.30	5.51
g/hr NO = 0.0182 (ppm NO)(exh. flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.76	7.07

TABLE D-22. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 1/26/71 Test Miles: 42,274 Test Configuration: LSM + Catalytic Muffler
Bus: 704 Test Hours: 3,267 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	200	139	249	Idle	—	12.80	.06	12.86	2.27	3.15	6.05	—
2	175	152	197	1000	—	20.30	.16	20.46	3.78	6.54	9.09	—
3	175	101	337	"	25.5	20.30	.21	20.51	3.79	4.36	15.59	2.04
4	212	76	599	"	54	20.10	.36	20.46	4.58	3.27	27.65	4.32
5	250	492	989	"	81	20.10	.53	20.63	5.45	21.36	46.03	6.48
6	312	4462	885	"	98	19.91	.65	20.56	6.77	193.02	41.05	7.84
7	125	139	260	Idle	—	12.80	.05	12.85	1.42	3.15	6.31	—
8	225	627	944	1600	139	33.45	.90	34.35	8.16	45.31	73.15	11.16
9	200	126	856	"	126	33.45	.81	34.26	7.24	9.08	66.16	10.08
10	162	38	612	"	81	33.78	.56	34.29	5.86	2.74	47.32	6.48
11	150	25	348	"	41	34.00	.36	34.36	5.44	1.81	26.98	3.28
12	150	38	348	"	—	34.00	.36	34.36	5.44	2.74	26.98	—
13	137	126	260	Idle	—	12.80	.06	12.86	1.56	3.86	6.32	—
								TOTALS	61.76	305.23	378.67	51.47

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	150	139	249	Idle	—	12.80	.05	12.85	1.70	3.15	6.05	—
2	162	152	197	1000	—	20.30	.16	20.46	3.50	6.54	9.09	—
3	175	88	390	"	25.5	20.30	.21	20.51	3.79	3.80	17.12	2.04
4	200	76	690	"	57	20.10	.39	20.49	4.32	3.27	31.88	4.56
5	250	654	1020	"	81	20.10	.53	20.63	5.45	28.39	47.47	6.48
6	262	4462	914	"	94	19.91	.63	20.54	5.68	196.93	42.55	7.52
7	125	136	260	Idle	—	12.80	.05	12.85	1.42	2.85	6.31	—
8	212	654	974	1600	136	33.45	.88	34.33	7.67	47.24	75.43	10.88
9	175	114	885	"	117	33.72	.75	34.47	6.37	8.29	68.82	9.36
10	137	38	594	"	66	34.00	.49	34.49	4.99	2.76	46.46	5.28
11	137	25	357	"	43	33.88	.37	34.25	4.96	1.80	27.74	3.44
12	150	25	359	"	—	34.00	.35	34.35	5.44	1.81	27.82	—
13	150	114	271	Idle	—	12.80	.05	12.85	1.70	2.58	6.58	—
								TOTALS	57.01	309.28	411.32	47.86

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(EXH FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.20	1.18
g/hr CO = 0.0165 (ppm CO)(EXH FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	5.91	6.24
g/hr NO = 0.0782 (ppm NO)(EXH FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.72	8.30

TABLE D-23. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 7/29/71 Test Miles: 42,274 Test Configuration: LSN + Stock Muffler
Bus: 704 Test Hours: 3,267 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	225	178	176	Idle	—	12.86	.05	12.91	2.57	4.05	4.27	—
2	237	216	145	1000	—	20.35	.10	20.45	5.12	9.29	6.69	—
3	212	114	326	"	22	20.35	.20	20.55	4.60	4.93	15.11	1.76
4	225	88	561	"	51	20.35	.35	20.70	4.92	3.83	26.20	4.08
5	312	359	856	"	78	20.35	.51	20.86	6.87	15.76	40.28	6.24
6	375	4272	799	"	92	20.32	.61	20.93	8.29	188.12	37.73	7.36
7	237	165	197	Idle	—	12.88	.05	12.93	2.71	3.76	4.81	—
8	312	519	827	1600	143	33.76	.92	34.68	11.43	37.87	64.70	11.44
9	250	76	690	"	119	33.62	.77	34.39	9.08	5.50	53.53	9.52
10	225	50	452	"	85	33.63	.56	34.19	8.12	3.60	34.86	6.80
11	212	63	282	"	41	34.02	.36	34.38	7.70	4.56	21.87	3.28
12	200	76	282	"	—	34.02	.34	34.36	7.26	5.49	21.86	—
13	225	178	218	Idle	—	12.84	.05	12.89	2.57	4.04	5.31	—
								TOTALS	81.24	290.80	337.24	50.48

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	225	203	197	Idle	—	12.88	.05	12.93	2.57	4.63	4.81	—
2	225	242	156	1000	—	20.35	.13	20.48	4.87	10.43	7.21	—
3	212	126	347	"	19	20.32	.18	20.50	4.59	5.43	16.05	1.52
4	225	101	561	"	56	20.35	.37	20.72	4.92	4.40	26.22	4.48
5	300	627	914	"	81	20.32	.63	20.95	6.61	27.51	43.20	6.48
6	337	4210	827	"	89	20.32	.60	20.92	7.44	185.31	39.03	7.12
7	225	190	218	Idle	—	12.80	.06	12.86	2.56	4.31	5.30	—
8	275	586	856	1600	143	33.73	.92	34.65	10.06	42.72	66.91	11.44
9	225	88	717	"	112	33.73	.73	34.46	8.19	6.38	55.74	8.96
10	200	65	464	"	78	33.73	.55	34.28	7.24	4.69	35.88	6.24
11	200	88	303	"	46	33.73	.39	34.12	7.21	6.32	23.32	3.68
12	182	88	292	"	—	34.02	.34	34.36	6.60	6.36	22.63	—
13	225	178	218	Idle	—	12.80	.05	12.85	2.56	4.03	5.29	—
								TOTALS	75.42	312.52	351.59	49.92

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0132(ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.61	1.51
g/hr CO = 0.0263(ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	5.76	6.26
g/hr NO = 0.0282(ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.68	7.04

TABLE D-24. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 7/29/71 Test Miles: 48,574 Test Configuration: 608 + Stock Muffler
Bus: 704 Test Hours: 3,267 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBS. POWER bhp (weighted)
1	1012	203	197	Idle	—	12.80	.05	12.85	11.80	4.60	4.78	—
2	1785	255	176	1000	—	20.30	.11	20.41	37.18	10.95	8.10	—
3	2400	303	303	"	28	20.30	.24	20.54	53.06	9.77	14.04	2.24
4	2500	329	512	"	56	20.30	.40	20.70	54.65	9.97	23.91	4.48
5	2412	1476	985	"	82	20.30	.55	20.85	55.11	65.19	36.92	6.56
6	2350	5677	985	"	96	20.30	.65	20.95	51.99	250.24	37.10	7.68
7	1025	190	207	Idle	—	12.80	.08	12.88	11.68	4.31	5.04	—
8	2125	1888	885	1600	151	33.73	1.01	34.74	77.96	137.00	69.36	12.08
9	2200	389	771	"	116	33.73	.78	34.51	80.19	26.07	60.03	9.28
10	2287	126	512	"	85	33.73	.60	34.33	82.91	7.10	39.65	6.80
11	2500	186	326	"	51	34.00	.44	34.44	90.92	9.15	25.39	4.08
12	2500	139	314	"	—	34.00	.41	34.41	90.84	10.06	24.58	—
13	1025	178	207	Idle	—	12.80	.05	12.85	11.64	4.03	5.03	—
								TOTALS	706.61	550.92	385.67	53.20

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBS. POWER bhp (weighted)
1	1000	227	197	Idle	—	12.80	.06	12.86	11.57	5.19	4.79	—
2	1725	268	176	1000	—	20.30	.13	20.43	39.38	11.52	8.11	—
3	2375	203	325	"	20	20.30	.20	20.50	51.41	8.76	15.03	1.60
4	2500	242	536	"	51	20.30	.36	20.66	54.54	10.52	24.98	4.08
5	2425	1455	827	"	83	20.30	.56	20.86	53.42	62.84	38.92	6.64
6	2325	5536	799	"	93	20.30	.64	20.94	51.41	245.90	37.75	7.44
7	1012	203	228	Idle	—	12.80	.08	12.88	11.53	5.50	5.85	—
8	2075	1886	927	1600	150	33.73	1.00	34.73	76.10	135.63	72.79	12.00
9	2175	396	870	"	118	33.73	.80	34.53	79.31	29.04	67.77	9.44
10	2200	186	586	"	80	33.73	.58	34.31	79.11	9.10	45.36	6.40
11	2500	139	357	"	46	33.98	.41	34.39	90.53	10.03	27.77	3.68
12	2500	139	348	"	—	34.00	.40	34.40	90.82	10.06	27.01	—
13	975	118	239	Idle	—	12.80	.05	12.85	11.08	4.05	5.40	—
								TOTALS	698.45	544.81	381.63	51.28

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	13.28	13.62
g/hr CO = 0.0165 (ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	10.35	10.62
g/hr NO = 0.0782 (ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.65	7.44

TABLE D-25. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 7/12/71 Test Miles: 39,374 Test Configuration: LSN + Catalytic Muffler
Bus: 707 Test Hours: 3,205 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	163	126	239	Idle	—	12.80	.07	12.87	1.86	2.86	5.81	—
2	150	126	209	1000	—	20.30	.12	20.42	3.23	5.41	9.54	—
3	155	101	326	"	23	20.30	.20	20.50	3.24	4.36	15.09	1.84
4	175	101	361	"	52	20.30	.36	20.66	3.82	4.39	26.15	4.16
5	225	333	856	"	71	20.30	.47	20.77	4.94	14.55	40.11	5.69
6	275	6998	799	"	107	20.30	.70	21.00	6.10	303.10	[illegible]	8.56
7	125	126	260	Idle	—	12.80	.07	12.87	1.42	2.86	6.32	—
8	200	1277	994	1600	155	33.98	1.03	34.76	9.34	93.37	96.76	13.40
9	175	152	771	"	110	33.73	.72	34.45	6.37	11.02	77.92	9.90
10	150	50	561	"	73	33.73	.58	34.31	5.42	3.61	42.45	[illegible]
11	185	50	505	"	37	33.73	.36	34.09	4.50	3.57	[illegible]	3.17
12	125	50	326	"	—	34.00	.38	34.38	4.07	3.62	[illegible]	—
13	150	101	260	Idle	—	12.80	.07	12.87	1.71	2.29	6.33	—
								TOTALS	[illegible]	[illegible]	[illegible]	57.50

RUN 2

Mode	C_6H_{14}, ppm	CO, ppm	NO, ppm	Engine Speed, rpm	Observed Power, bhp	Air Flow, lb/min	Fuel Flow, lb/min	Exhaust Flow, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	Observed bhp (weighted)
1	163	139	239	Idle	—	12.80	.07	12.87	1.76	3.15	5.51	—
2	150	126	218	1000	—	20.30	.13	20.43	3.24	5.42	10.08	—
3	175	101	357	"	27	20.30	.23	20.53	3.77	4.36	16.63	2.16
4	200	101	596	"	52	20.30	.36	20.66	4.36	4.37	27.71	4.16
5	225	599	944	"	76	20.30	.50	20.80	4.94	26.21	44.30	6.08
6	250	6413	856	"	100	20.30	.68	20.98	5.54	285.09	40.84	8.00
7	138	126	295	Idle	—	12.80	.07	12.87	1.57	2.86	6.76	—
8	200	1248	1020	1600	148	33.73	.77	34.50	[illegible]	91.12	99.55	11.84
9	175	126	927	"	110	33.73	.72	34.45	6.37	7.15	64.21	[illegible]
10	163	63	616	"	81	33.73	.57	34.30	[illegible]	4.55	47.26	[illegible]
11	138	50	326	"	39	33.73	.36	34.09	4.77	3.57	25.07	3.12
12	138	50	357	"	—	34.00	.37	34.37	5.01	3.62	26.13	—
13	150	114	260	Idle	—	12.80	.07	12.87	1.71	2.57	6.33	—
								TOTALS	56.57	414.09	420.48	55.44

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.06	1.02
g/hr CO = 0.0265 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	8.10	7.77
g/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.32	7.91

TABLE D-26. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 7/15/71 Test Miles: 39,374 Test Configuration: LSN + Stock Muffler
Bus: 707 Test Hours: 3,205 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	212	114	199	Idle	—	12.92	.07	12.99	3.04	2.61	4.84	—
2	200	114	166	1000	—	20.35	.15	20.50	4.53	4.92	7.68	—
3	187	96	316	"	27	20.38	.23	20.61	4.47	3.30	14.60	2.16
4	200	63	512	"	55	20.35	.37	20.72	4.59	2.75	23.93	4.40
5	262	359	796	"	73	20.35	.48	20.83	5.74	15.73	36.97	5.84
6	300	6066	771	"	101	20.35	.67	21.02	6.67	270.66	36.40	8.08
7	200	114	217	Idle	—	12.88	.08	12.96	2.17	2.60	5.29	—
8	250	1045	914	1600	137	33.94	.79	34.73	9.21	76.80	72.02	10.96
9	200	38	586	"	96	33.96	.62	34.58	9.16	2.78	45.71	7.56
10	175	25	487	"	73	33.73	.44	34.17	6.23	1.81	37.54	5.84
11	180	25	292	"	41	34.04	.37	34.41	5.41	1.81	22.67	3.28
12	180	38	312	"	—	34.04	.37	34.41	5.46	2.75	24.22	—
13	200	101	217	Idle	—	12.88	.08	12.96	2.29	2.31	5.31	—
								TOTALS	62.74	[illegible]	[illegible]	[illegible]

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	220	114	229	Idle	—	12.88	.07	12.95	2.77	2.60	5.56	—
2	175	114	176	1000	—	20.38	.15	20.53	3.97	4.96	8.15	—
3	187	96	337	"	27	20.35	.23	20.58	4.76	3.29	15.65	2.16
4	200	88	561	"	56	20.38	.38	20.76	4.39	3.74	26.27	4.48
5	175	545	799	"	68	20.35	.50	21.58	4.05	23.91	40.53	5.44
6	270	6490	827	"	110	20.32	.72	21.04	6.11	289.30	39.21	8.80
7	200	101	249	Idle	—	12.88	.08	12.96	2.27	2.31	6.10	—
8	230	1045	973	1600	173	33.94	1.00	34.79	9.17	76.95	76.36	13.84
9	272	96	799	"	117	33.73	.72	34.45	9.71	5.81	62.10	9.36
10	187	25	578	"	73	33.73	.54	34.27	6.77	1.80	39.58	5.84
11	162	25	314	"	41	34.00	.37	34.37	5.89	1.81	24.35	3.28
12	175	25	303	"	—	34.00	.35	34.35	6.35	1.81	23.48	—
13	200	96	239	Idle	—	12.84	.08	12.92	2.29	1.73	5.83	—
								TOTALS	67.14	417.31	374.37	[illegible]

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0152(ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.34	1.51
g/hr CO = 0.0265(ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	8.37	9.16
g/hr NO = 0.0282(ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.92	7.74

TABLE D-27. 13 MODE CYCLE EMISSIONS - EIP FLEET TEST

Date: 7/17/71 Test Miles: 39,374 Test Configuration: 608 + Stock Muffler
Bus: 707 Test Hours: 3,205 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	gm/hr C_6H_{14} (weighted)	gm/hr CO (weighted)	gm/hr NO (weighted)	OBSERVED bhp (weighted)
1	700	178	186	Idle	—	12.88	.05	12.93	8.00	4.06	4.34	—
2	1250	203	186	1000	—	20.35	.12	20.47	27.02	7.74	8.67	—
3	2000	178	348	"	27	20.26	.23	20.58	43.47	7.71	16.16	3.78
4	1848	203	536	"	60	20.32	.40	20.72	39.93	8.85	25.06	4.50
5	1818	599	777	"	82	20.15	.54	20.89	39.97	26.13	37.66	6.56
6	1937	4721	841	"	102	20.32	.67	20.99	42.95	208.49	39.92	8.16
7	700	165	197	Idle	—	12.88	.05	12.93	8.00	3.76	4.41	—
8	1900	1233	974	1600	185	33.56	1.01	34.57	69.36	89.68	75.76	[illegible]
9	1800	165	727	"	131	33.56	.77	34.33	65.75	11.92	48.05	[illegible]
10	1775	101	549	"	85	33.56	.58	34.14	63.99	7.25	[illegible]	[illegible]
11	2050	114	303	"	60	33.58	.40	33.98	73.56	8.15	[illegible]	[illegible]
12	2025	186	303	"	—	33.58	.37	33.95	72.60	[illegible]	[illegible]	—
13	700	152	218	Idle	—	12.88	.05	12.93	8.10	3.46	[illegible]	—
								TOTALS	522.08	[illegible]	[illegible]	[illegible]

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	gm/hr C_6H_{14} (weighted)	gm/hr CO (weighted)	gm/hr NO (weighted)	OBSERVED bhp (weighted)
1	712	203	197	Idle	—	12.88	.05	12.93	8.14	4.63	4.37	—
2	1225	203	197	1000	—	20.35	.13	20.48	26.49	[illegible]	9.18	—
3	1900	178	370	"	33	20.32	.25	20.57	42.36	7.70	17.17	3.64
4	1780	203	574	"	[illegible]	20.35	.39	20.74	39.33	8.86	26.86	[illegible]
5	1787	519	756	"	[illegible]	20.35	.50	20.85	37.38	22.77	40.86	[illegible]
6	1937	4986	914	"	[illegible]	20.30	.67	20.97	42.97	219.99	43.24	8.16
7	725	165	218	Idle	—	12.90	.05	12.95	9.24	3.74	5.21	—
8	1875	1366	1004	1600	[illegible]	33.73	.77	34.50	69.75	99.79	78.64	[illegible]
9	1775	165	899	"	131	33.73	.77	34.50	64.67	11.99	69.97	[illegible]
10	1750	101	686	"	93	33.73	.56	34.29	63.77	7.29	48.33	6.54
11	1950	114	337	"	60	33.75	.40	34.15	67.91	8.14	25.91	4.50
12	1900	114	348	"	—	33.55	.37	33.92	67.66	8.14	26.63	—
13	900	137	227	Idle	—	12.90	.05	12.95	7.96	3.15	3.54	—
								TOTALS	548.52	414.73	398.65	54.50

		RUN 1	RUN 2
gm/hr C_6H_{14} = 0.0152 (ppm C_6H_{14})(Exh. Flow, lb/min)(Weight Factor)	BSHC, gm/bhp hr	10.12	10.01
gm/hr CO = 0.0763 (ppm CO)(Exh. Flow, lb/min)(Weight Factor)	BSCO, gm/bhp hr	7.16	7.57
gm/hr NO = 0.0782 (ppm NO)(Exh. Flow, lb/min)(Weight Factor)	BSNO, gm/bhp hr	6.68	7.27

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13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-28. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1   3-10-72
BUS NO. 702 TEST MILES 80116 LOW INJECTORS + STOCK MUFFLER

```
==========================================================================
MODE  ENGINE   REAR    FLY-     FUEL     AIR     EXHAUST   FUEL
       SPEED   WHEEL   WHEEL    FLOW     FLOW     FLOW     AIR
        RPM     BHP     BHP    LB/MIN   LB/MIN   LB/MIN    RATIO
==========================================================================
  1     450       0       0      .04    13.00    13.04     .003
  2    1000       0       0      .10    20.68    20.80     .005
  3    1000      10      22      .20    20.46    20.68     .010
  4    1000      35      48      .33    20.46    20.79     .016
  5    1000      58      73      .48    20.45    20.93     .023
  6    1000      78      96      .65    20.44    21.09     .032
  7     450       0       0      .05    13.00    13.05     .004
  8    1600     103     136      .89    34.21    35.10     .026
  9    1600      79     109      .68    34.19    34.87     .020
 10    1600      44      78      .52    34.17    34.69     .015
 11    1600      10      31      .32    34.54    34.86     .009
 12    1600       0       0      .35    34.47    34.82     .010
 13     450       0       0      .05    12.96    13.01     .004



==========================================================================
MODE    HC       CO       NO     WEIGHTED    BSHC      BSCO      BSNO2

        PPM      PPM      PPM      BHP     G/HP HR   G/HP HR   G/HP HR
==========================================================================
  1     176      147      227      0.00        *         *         *
  2     172      188      186      0.00        *         *         *
  3     180      120      336      1.76      2.23      2.47     13.64
  4     200       44      523      3.84      1.14      1.07      9.79
  5     222      188      742      5.84       .56      1.42      9.19
  6     272     2708      868      7.68       .79     15.65      8.24
  7     196      120      270      0.00        *         *         *
  8     244      585      868     10.88       .83      4.47      9.68
  9     200       67      675      8.32       .85       .59      9.78
 10     180       52      474      5.76      1.14       .67      9.86
 11     180       67      242      2.48      2.67      1.48     14.18
 12     172       67      302      0.00        *         *         *
 13     180      107      270      0.00        *         *         *

CYCLE COMPOSITE     BSHC   =  1.419   GRAM/BHP HR
                    BSCO   =  4.648   GRAM/BHP HR
                    BSNO2  = 11.509   GRAM/BHP HR
             BSHC + BSNO2  = 12.927   GRAM/BHP HR
                    BSFC   =   .481     LB/BHP HR
```

```
                13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-29. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2   3-10-72
        BUS NO. 708   TEST MILES' 80116  LOW INJECTORS + STOCK MUFFLER
=====================================================================
MODE  ENGINE   REAR    FLY-     FUEL     AIR     EXHAUST   FUEL
      SPEED    WHEEL   WHEEL    FLOW     FLOW     FLOW     AIR
       RPM      BHP     BHP    LB/MIN   LB/MIN   LB/MIN   RATIO
=====================================================================
  1     450       0       0      .05     13.00    13.05     .004
  2    1000       0       0      .13     20.65    20.78     .006
  3    1000      10      24      .21     20.48    20.69     .010
  4    1000      35      48      .33     20.56    20.89     .016
  5    1000      58      72      .47     20.45    20.92     .023
  6    1000      78      94      .63     20.44    21.07     .031
  7     450       0       0      .05     13.00    13.05     .004
  8    1600     109     136      .88     34.80    35.68     .026
  9    1600      79     102      .67     34.15    34.82     .020
 10    1600      49      69      .50     34.48    34.98     .015
 11    1600      10      31      .32     34.60    34.92     .009
 12    1600       0       0      .21     34.55    34.76     .006
 13     450       0       0      .05     12.96    13.01     .004


=====================================================================
MODE   HC      CO      NO    WEIGHTED   BSHC      BSCO      BSNO2

       PPM     PPM     PPM     BHP    G/HP HR   G/HP HR   G/HP HR
=====================================================================
  1    176     134     217     0.00       M         M         M
  2    172     174     186     0.00       M         M         M
  3    180     107     308     1.92     2.05      2.43     11.25
  4    152      94     462     3.84     1.10      1.07      8.65
  5    236     174     645     5.76      .91      1.32      8.15
  6    276    2767     783     7.52      .82     16.31      7.58
  7    172     134     240     0.00       M         M         M
  8    258     526     783    10.88      .84      4.25      8.73
  9    196      94     645     8.16      .80       .54      9.57
 10    176      67     450     5.52     1.17       .85      9.77
 11    172      80     281     2.48     2.56      2.36     12.69
 12    172      80     281     0.00       M         M         M
 13    184     120     248     0.00       M         M         M

CYCLE COMPOSITE    BSHC  =  1.408  GRAM/BHP HR
                   BSCO  =  4.890  GRAM/BHP HR
                   BSNO2 = 10.712  GRAM/BHP HR
            BSHC + BSNO2 = 12.120  GRAM/BHP HR
                   BSFC  =   .470    LB/BHP HR
```

```
                 13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-30. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1   3-15-78
            BUS NO. 702   TEST MILES: 80116   N INJECTORS + STOCK MUFFLER
================================================================
MODE   ENGINE   REAR     FLY-     FUEL     AIR    EXHAUST   FUEL
        SPEED   WHEEL    WHEEL    FLOW     FLOW    FLOW     AIR
         RPM     BHP      BHP    LB/MIN   LB/MIN  LB/MIN   RATIO
================================================================
  1      450       0        0      .03    13.00    13.03    .002
  2     1000       0        0      .13    20.65    20.78    .006
  3     1000      12       22      .21    20.57    20.78    .010
  4     1000      35       50      .36    20.56    20.92    .018
  5     1000      60       71      .50    20.43    20.93    .024
  6     1000      81      100      .70    20.45    21.14    .034
  7      450       0        0      .03    13.00    13.03    .003
  8     1600     112      151     1.03    34.05    35.08    .030
  9     1600      87      125      .84    34.05    34.89    .025
 10     1600      51       82      .53    34.09    34.63    .017
 11     1600      11       41      .39    34.29    34.68    .012
 12     1600       0        0      .31    34.51    34.82    .010
 13      450       0        0      .06    13.00    13.06    .004


================================================================
MODE    HC       CO       NO     WEIGHTED    BSHC      BSCO     BSNO2

        PPM      PPM      PPM      BHP     G/HP HR   G/HP HR   G/HP HR
================================================================
  1     352      188      165      0.00        0         0         0
  2     644      310      165      0.00        0         0         0
  3     949      242      302      1.77    11.71      5.98     12.26
  4    1072      215      486      4.00    10.24      2.35      9.79
  5    2192      256      715      5.68     8.58      1.44      9.41
  6    2096     4427      840      8.00     8.85     24.61      7.67
  7     305      180      206      0.00        0         0         0
  8    1800     1485      912     12.24     5.47      8.95      9.03
  9    2096      242      825     10.00     7.70      1.78      9.90
 10    1520      161      535      5.56     8.47      1.74      9.76
 11    1264      215      302      3.28    14.11      4.78     11.04
 12    1844      201      413      0.00        0         0         0
 13     336      179      206      0.00        0         0         0

CYCLE COMPOSITE    BSHC  =  9.257  GRAM/BHP HR
                   BSCO  =  8.226  GRAM/BHP HR
                   BSNO2 = 10.699  GRAM/BHP HR
            BSHC + BSNO2 = 19.957  GRAM/BHP HR
                   BSFC  =   .488    LB/BHP HR
```

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                    13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-31. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2   3-15-78
            BUS NO. 702   TEST MILES: 80116   B INJECTORS + STOCK MUFFLER
==================================================================
MODE  ENGINE   REAR    FLY-    FUEL    AIR     EXHAUST   FUEL
      SPEED    WHEEL   WHEEL   FLOW    FLOW    FLOW      AIR
      RPM      BHP     BHP    LB/MIN  LB/MIN  LB/MIN    RATIO
==================================================================
  1     450      0       0      .03    13.00   13.03     .003
  2    1000      0       0      .14    20.68   20.82     .007
  3    1000     12      25      .23    20.47   20.70     .011
  4    1000     36      49      .35    20.93   21.28     .017
  5    1000     60      74      .50    20.42   20.92     .025
  6    1000     80      99      .69    20.44   21.13     .034
  7     450      0       0      .04    12.96   13.00     .003
  8    1600    118     152     1.01    34.08   35.09     .030
  9    1600     87     120      .81    34.10   34.91     .024
 10    1600     51      75      .56    34.07   34.63     .016
 11    1600     11      34      .36    34.39   34.75     .011
 12    1600      0       0      .36    33.90   34.26     .011
 13     450      0       0      .05    12.96   13.01     .004



==================================================================
MODE   HC      CO      NO     WEIGHTED   BSHC     BSCO     BSNO2

       PPM     PPM     PPM      BHP     G/HP HR  G/HP HR  G/HP HR
==================================================================
  1     240     179     195     0.00       0        0        0
  2     432     256     135     0.00       0        0        0
  3     800     228     252     2.00     8.74     4.96    10.99
  4    1536     201     450     3.92     8.60     2.24     8.25
  5    1792     242     742     5.92     6.59     1.80     9.06
  6    1872    4543     826     7.92     6.27    24.38     7.61
  7     256     161     175     0.00       0        0        0
  8    1548    1397     897    12.16     5.02     8.48     8.95
  9    1872     201     811     9.60     7.19     1.59    10.19
 10    1264     147     510     6.00     7.20     1.74    10.17
 11    1024     188     259     2.72    14.82     5.05    11.99
 12    1152     188     270     0.00       0        0        0
 13     288     161     186     0.00       0        0        0
CYCLE COMPOSITE    BSHC  =  8.106   GRAM/BHP HR
                   BSCO  =  8.020   GRAM/BHP HR
                   BSNO2 = 10.491   GRAM/BHP HR
            BSHC + BSNO2 = 18.598   GRAM/BHP HR
                   BSFC  =   .489     LB/BHP HR
```

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                        13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-32. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1    8-15-73
            BUS NO. 708   TEST MILES 63116   8 INJECTORS + STUCK MUFFLER
            ============================================================
            MODE  ENGINE   REAR    FLY-    FUEL     AIR    EXHAUST  FUEL
                  SPEED    WHEEL   WHEEL   FLOW     FLOW    FLOW     AIR
                   RPM      BHP     BHP   LB/MIN   LB/MIN  LB/MIN   RATIO
            ============================================================
              1     480       0       0     .03    18.56   18.59    .002
              2     480       0       0     .14    20.64   20.78    .007
              3    1000      12      26     .33    20.33   20.66    .016
              4    1000      36      49     .36    20.44   20.80    .018
              5    1000      60      75     .51    20.41   20.92    .025
              6    1000      81      99     .69    20.43   21.12    .034
              7     480       0       0     .04    18.92   18.96    .002
              8    1600     142     180    1.01    35.07   36.08    .029
              9    1600      98     121     .76    35.02   35.78    .022
             10    1600      50      78     .57    35.09   35.66    .016
             11    1600      11      36     .37    35.53   35.90    .010
             12    1600       0       0     .37    35.41   35.78    .010
             13     480       0       0     .05    18.92   18.97    .003


            ============================================================
            MODE    HC      CO      NO    WEIGHTED   BSHC     BSCO    BSNO2

                   PPM     PPM     PPM      BHP    G/HP HR  G/HP HR  G/HP HR
            ============================================================
              1    192     179     165     0.00        0        0        0
              2    400     283     165     0.00        0        0        0
              3    800     248     443     2.08     8.89     3.43    10.74
              4   1440     801     462     3.92     8.07     2.84     9.47
              5   1776     840     745     6.00     6.59     2.87     9.56
              6   2048    4682     797     7.92     6.77    26.87     7.95
              7    856     161     806     0.00        0        0        0
              8   1872    1953     897    14.40     3.78     4.38     9.06
              9   1596     188     783     9.68     9.01     1.56    10.60
             10   1896     185     623     6.24     7.60     1.57    10.09
             11   1086     179     808     2.88    18.47     4.48    12.61
             12   1168     179     302     0.00        0        0        0
             13    304     197     206     0.00        0        0        0

            CYCLE COMPOSITE    BSHC  =  8.433  GRAM/BHP HR
                               BSCO  =  8.255  GRAM/BHP HR
                               BSNO2 = 10.759  GRAM/BHP HR
                        BSHC + BSNO2 = 19.192  GRAM/BHP HR
                               BSFC  =   .491    LB/BHP HR
```

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-33. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 2-22-78
BUS NO. 704 TEST MILES 79702 LSN INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	525	0	0	.05	12.96	13.00	.003
2	1000	0	0	.12	20.90	20.60	.006
3	1000	8	22	.18	20.96	20.69	.009
4	1000	35	45	.28	20.86	20.88	.016
5	1000	60	74	.48	20.27	20.76	.024
6	1000	80	102	.70	20.29	20.99	.034
7	525	0	0	.05	12.96	13.01	.004
8	1600	104	151	.90	33.65	34.63	.029
9	1600	70	110	.72	37.65	34.36	.021
10	1600	35	72	.52	33.68	34.15	.015
11	1600	5	38	.35	33.63	33.90	.010
12	1600	0	0	.27	33.59	33.96	.011
13	525	0	0	.06	12.96	13.01	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	228	201	206	0.00	M	M	M
2	216	252	175	0.00	M	M	M
3	212	134	369	1.76	2.63	3.31	14.96
4	188	107	585	3.60	1.13	1.25	11.84
5	224	252	927	5.92	.88	1.78	11.02
6	276	2883	952	8.16	.75	21.02	8.97
7	216	161	258	0.00	M	M	M
8	232	626	972	12.08	.70	3.78	9.63
9	200	80	723	8.80	.82	.66	9.03
10	196	67	462	5.76	1.02	.83	9.96
11	208	80	292	3.04	2.96	1.08	11.22
12	220	54	202	0.60	M	M	M
13	272	147	227	0.00	M	M	M

CYCLE COMPOSITE BSHC = 1.443 GRAM/BHP HR
BSCO = 5.768 GRAM/BHP HR
BSNO2 = 11.562 GRAM/BHP HR
BSHC + BSNO2 = 13.005 GRAM/BHP HR
BSFC = .474 LB/BHP HR

```
                    13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-34. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2   2-22-78
       BUS NO. 704  TEST MILES' 75782  LBN INJECTORS + STOCK MUFFLER
   ==================================================================
   MODE  ENGINE  REAR    FLY-    FUEL    AIR    EXHAUST  FUEL
          SPEED  WHEEL   WHEEL   FLOW    FLOW    FLOW    AIR
           RPM    BHP     BHP   LB/MIN  LB/MIN  LB/MIN   RATIO
   ==================================================================
     1     525      0       0     .04    12.92   12.96    .003
     2    1000      0       0     .10    20.29   20.39    .005
     3    1000      8      27     .22    20.50   20.72    .011
     4    1000     35      50     .34    20.50   20.84    .017
     5    1000     60      75     .49    20.29   20.78    .024
     6    1000     80     100     .60    20.37   20.97    .029
     7     525      0       0     .04    12.92   12.96    .003
     8    1600    102     141     .92    33.62   34.54    .027
     9    1600     70     105     .69    33.65   34.34    .021
    10    1600     46      69     .49    33.63   34.12    .015
    11    1600      5      35     .33    33.69   34.02    .010
    12    1600      0       0     .36    33.63   33.99    .011
    13     525      0       0     .05    12.92   12.97    .004


   ==================================================================
   MODE    HC      CO      NO    WEIGHTED   BSHC     BSCO     BSNO2

           PPM     PPM     PPM      BHP    G/HP HR  G/HP HR  G/HP HR
   ==================================================================
     1     222     161     217     0.00        M        M        M
     2     220     188     175     0.00        M        M        M
     3     200     107     347     2.16     2.03     2.16    11.51
     4     196      99     697     4.00     1.08     1.03    10.75
     5     236     215     972     6.00      .86     1.57    11.69
     6     272    3553     987     8.00      .76    14.65     8.99
     7     196     147     259     0.00        M        M        M
     8     212     653    1002    11.28      .69     4.21    10.60
     9     184      67     756     8.40      .79      .58    10.68
    10     172      53     474     5.52     1.12      .59    10.13
    11     176      80     313     2.80     2.26     2.06    10.19
    12     180      80     313     0.00        M        M        M
    13     216     134     248     0.00        M        M        M

   CYCLE COMPOSITE    BSHC  =  1.363  GRAM/BHP HR
                      BSCO  =  5.425  GRAM/BHP HR
                      BSNO2 = 12.206  GRAM/BHP HR
              BSHC + BSNO2  = 13.569  GRAM/BHP HR
                      BSFC  =   .474    LB/BHP HR
```

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-35. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 3   2-22-78
BUS NO. 704   TEST MILES' 79702   LSN INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	585	0	0	.05	12.88	12.93	.004
2	1000	0	0	.11	20.49	20.60	.005
3	1000	8	24	.19	20.48	20.67	.009
4	1000	25	50	.34	20.50	20.84	.017
5	1000	60	75	.49	20.31	20.80	.024
6	1000	88	98	.67	20.28	20.95	.033
7	585	0	0	.04	12.88	12.92	.003
8	1600	104	144	.97	33.65	34.62	.029
9	1600	70	110	.72	33.65	34.37	.021
10	1600	36	70	.51	33.60	34.11	.015
11	1600	5	36	.35	33.61	33.95	.010
12	1600	0	0	.36	33.54	33.90	.011
13	585	0	0	.06	12.90	12.97	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	244	174	206	0.00	N	N	N
2	282	215	186	0.00	N	N	N
3	204	147	336	1.92	2.42	3.40	13.05
4	216	147	547	4.00	1.14	1.61	9.85
5	252	256	850	6.00	.92	1.87	10.07
6	336	4410	857	7.84	.95	21.46	8.88
7	220	228	248	0.00	N	N	N
8	248	766	927	11.52	.76	4.60	9.81
9	200	161	854	8.80	.82	1.38	11.53
10	184	134	462	5.60	1.18	1.72	9.78
11	196	147	313	2.88	2.49	3.65	12.75
12	200	161	313	0.00	N	N	N
13	232	215	248	0.00	N	N	N

CYCLE COMPOSITE   BSHC = 1.480   GRAM/BHP HR
BSCO = 6.939   GRAM/BHP HR
BSNO2 = 11.630   GRAM/BHP HR
BSHC + BSNO2 = 13.110   GRAM/BHP HR
BSFC = .494   LB/BHP HR

```
                13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-36. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1   8-29-78
            BUS NO. 704   TEST MILES 74722   8 INJECTORS + STOCK MUFFLER
=======================================================================
MODE  ENGINE   REAR    FLY-     FUEL     AIR     EXHAUST   FUEL
       SPEED   WHEEL   WHEEL    FLOW     FLOW     FLOW     AIR
        RPM     BHP     BHP    LB/MIN   LB/MIN   LB/MIN   RATIO
=======================================================================
  1     525      0       0       .05    12.52    12.57    .004
  2    1000      0       0       .15    20.49    20.64    .007
  3    1000      7      22       .21    20.50    20.71    .010
  4    1000     34      50       .35    20.50    20.85    .017
  5    1000     60      82       .56    20.48    21.04    .027
  6    1000     76      99       .69    20.47    21.16    .034
  7     525      0       0       .05    12.52    12.57    .004
  8    1600    112     156      1.05    33.67    34.72    .031
  9    1600     77     119       .77    33.62    34.39    .023
 10    1600     49      80       .58    33.61    34.19    .017
 11    1600      7      31       .35    33.64    33.99    .010
 12    1600      0       0       .37    33.66    34.03    .011
 13     525      0       0       .06    12.81    12.87    .005



=======================================================================
MODE    HC      CO      NO     WEIGHTED    BSHC      BSCO      BSNO2

        PPM     PPM     PPM      BHP     G/HP HR   G/HP HR   G/HP HR
=======================================================================
  1     916     288     186      0.00         0         0         0
  2    1440     296     175      0.00         0         0         0
  3    1909     288     313      1.76     24.65      5.64     12.73
  4    2656     170     523      3.89     15.23      2.15      9.81
  5    2128     347     840      6.56      7.21      2.02      9.31
  6    2096    6197     840      7.92      6.41     24.84      7.76
  7     848     188     227      0.00         0         0         0
  8     960    2269     957     12.48      2.82     13.28      9.20
  9    1989     201     811      9.52      7.90      1.59     10.87
 10    2032     139     560      6.40     11.96      1.81     10.89
 11    2416     151     302      2.48     24.47      4.64     14.80
 12    2289     129     313      0.00         0         0         0
 13     880     188     206      0.00         0         0         0

CYCLE COMPOSITE      BSHC   = 12.059  GRAM/BHP HR
                     BSCO   = 10.965  GRAM/BHP HR
                     BSNO2  = 11.233  GRAM/BHP HR
              BSHC + BSNO2  = 23.292  GRAM/BHP HR
                     BSFC   =   .445    LB/BHP HR
```

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                    13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-37.  13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2   2-25-78
             BUS NO. 709   TEST MILES 74922   B INJECTORS + STOCK MUFFLER
=========================================================================
MODE  ENGINE   REAR    FLY-     FUEL     AIR     EXHAUST   FUEL
      SPEED    WHEEL   WHEEL    FLOW     FLOW    FLOW      AIR
      RPM      BHP     BHP     LB/MIN   LB/MIN   LB/MIN    RATIO
=========================================================================
  1     525      0       0      .05     12.92    12.97     .004
  2    1000      0       0      .13     20.48    20.61     .007
  3    1000      7      23      .20     20.58    20.78     .011
  4    1000     24      56      .34     20.50    20.84     .017
  5    1000     50      76      .52     20.48    21.00     .026
  6    1000     76      97      .67     20.47    21.14     .033
  7     525      0       0      .05     12.92    12.97     .004
  8    1600    112     155     1.04     33.65    34.69     .031
  9    1600     77     113      .77     33.64    34.41     .023
 10    1600     48      77      .52     33.68    34.20     .017
 11    1600      7      31      .35     33.63    33.98     .010
 12    1600      0       0      .37     33.65    34.02     .011
 13     525      0       0      .06     12.83    12.89     .005


=========================================================================
MODE   HC       CO      NO     WEIGHTED    BSHC      BSCO      BSNO2

       PPM      PPM     PPM      BHP     G/HP HR   G/HP HR   G/HP HR
=========================================================================
  1    869      188     186      0.00        0         0         0
  2   1552      256     175      0.00        0         0         0
  3   1904      201     292      1.84    22.66      4.77     11.37
  4   2096      201     486      3.68    17.32      2.40      9.51
  5   2160      374     737      6.08     7.88      3.44      9.51
  6   2128     5022     850      7.76     6.12     11.38      7.41
  7    880      188     205      0.00        0         0         0
  8   1752     2035     967     12.40     5.29     12.00      9.25
  9   2096      188     811      9.04     8.92      1.51     10.67
 10   2144      120     557      6.16    12.57      1.40     10.99
 11   2608      147     312      2.48    37.72      4.04     14.02
 12   2576      161     302      0.00        0         0         0
 13    896      174     206      0.00        0         0         0

CYCLE COMPOSITE      BSHC   = 13.555   GRAM/BHP HR
                     BSCO   = 10.402   GRAM/BHP HR
                     BSNO2  = 11.288   GRAM/BHP HR
              BSHC + BSNO2  = 24.843   GRAM/BHP HR
                     BSFC   =   .496     LB/BHP HR
```

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-38. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 3 2-25-72
BUS NO. 704 TEST MILES: 79722 8 INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	525	0	0	.05	12.32	12.37	.004
2	1000	0	0	.12	20.51	20.63	.006
3	1000	7	25	.22	20.50	20.72	.011
4	1000	24	51	.37	20.50	20.87	.018
5	1000	50	76	.50	20.50	21.00	.024
6	1000	75	98	.68	20.49	21.17	.033
7	525	0	0	.05	12.96	13.01	.004
8	1600	112	156	1.05	28.65	29.70	.037
9	1600	77	112	.76	28.64	29.40	.027
10	1600	48	78	.57	28.64	29.21	.020
11	1600	7	33	.36	28.64	29.00	.013
12	1600	0	0	.37	28.67	29.04	.013
13	525	0	0	.06	12.96	13.02	.005

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	789	201	196	0.00	*	*	*
2	1456	269	165	0.00	*	*	*
3	2069	219	300	2.00	22.59	4.69	10.82
4	2680	188	523	4.08	15.52	2.02	9.89
5	2096	802	890	6.08	7.69	3.65	10.03
6	2160	6096	890	7.84	6.16	24.36	7.84
7	840	179	227	0.00	*	*	*
8	1936	2003	987	12.48	5.68	18.00	5.98
9	2096	188	797	8.96	8.80	1.92	10.97
10	2160	120	578	6.24	12.51	1.38	10.85
11	2695	161	302	2.64	34.60	4.36	13.44
12	2560	161	313	0.00	*	*	*
13	880	188	206	0.00	*	*	*

CYCLE COMPOSITE BSHC = 12.780 GRAM/BHP HR
BSCO = 10.757 GRAM/BHP HR
BSNO2 = 11.832 GRAM/BHP HR
BSHC + BSNO2 = 24.612 GRAM/BHP HR
BSFC = .491 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-39. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 2-15-72
BUS NO. 707 TEST MILES 77891 LOW INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	480	0	0	.05	12.92	12.97	.004
2	1000	0	0	.14	20.57	20.71	.007
3	1000	10	32	.25	20.56	20.81	.012
4	1000	38	54	.38	20.37	20.75	.018
5	1000	62	81	.53	20.35	20.88	.026
6	1000	80	105	.74	20.35	21.09	.036
7	480	0	0	.04	12.92	12.96	.003
8	1600	112	158	1.04	34.02	35.06	.031
9	1600	82	121	.78	34.95	35.73	.023
10	1600	55	80	.55	34.95	35.50	.016
11	1600	12	45	.38	34.97	35.35	.011
12	1600	0	0	.35	35.32	35.67	.010
13	480	0	0	.05	12.92	12.97	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	168	99	227	0.00	0	0	0
2	159	120	186	0.00	0	0	0
3	160	99	358	2.56	1.29	1.61	10.06
4	158	99	623	4.32	.77	.96	10.39
5	162	323	987	6.48	.55	2.13	10.99
6	180	7550	884	8.40	.58	35.85	7.66
7	162	99	281	0.00	0	0	0
8	156	1812	1080	12.64	.46	10.58	10.83
9	138	120	972	9.68	.52	.91	11.68
10	132	67	657	6.40	.75	.76	11.12
11	134	67	381	3.60	1.45	1.95	12.57
12	130	67	227	0.00	0	0	0
13	104	120	270	0.00	0	0	0

CYCLE COMPOSITE BSHC = .907 GRAM/BHP HR
BSCO = 4.790 GRAM/BHP HR
BSNO2 = 11.762 GRAM/BHP HR
BSHC + BSNO2 = 12.668 GRAM/BHP HR
BSFC = .466 LB/BHP HR

```
                   13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-40. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2   2-15-78
            BUS NO. 707  TEST MILES' 77841  LOW INJECTORS + STOCK MUFFLER
        ================================================================
        MODE  ENGINE   REAR     FLY-     FUEL      AIR    EXHAUST   FUEL
               SPEED   WHEEL    WHEEL    FLOW      FLOW    FLOW     AIR
                RPM     BHP      BHP    LB/MIN   LB/MIN   LB/MIN   RATIO
        ================================================================
          1     480       0        0      .04     12.92    12.96    .003
          2    1000       0        0      .16     20.57    20.72    .007
          3    1000      10       26      .22     20.52    20.74    .011
          4    1000      38       54      .37     20.38    20.75    .018
          5    1000      52       78      .52     20.35    20.87    .025
          6    1000      81      104      .73     20.30    21.05    .036
          7     480       0        0      .04     12.92    12.96    .003
          8    1600     115      159     1.05     34.00    35.05    .031
          9    1600      82      119      .77     33.95    34.72    .023
         10    1600      52       78      .54     33.95    34.49    .016
         11    1600      10       43      .37     33.97    34.34    .011
         12    1600       0        0      .36     35.31    35.67    .010
         13     480       0        0      .05     12.92    12.97    .004



        ================================================================
        MODE   HC       CO       NO     WEIGHTED    BSHC     BSCO    BSNO2

               PPM      PPM      PPM      BHP     G/HP HR  G/HP HR  G/HP HR
        ================================================================
          1    180      120      228      0.00         *        *        *
          2    170      134      196      0.00         *        *        *
          3    160       80      347      2.08      1.69     1.68    11.90
          4    140       51      547      4.32       .81      .54     9.91
          5    172      269      927      6.24       .61     1.89    10.71
          6    180     2143      840      8.32       .48    42.35     7.35
          7    180      107      270      0.00         *        *        *
          8    158     1767     1059     12.72       .43    10.29     9.99
          9    160       80      847      9.52       .58      .61    11.81
         10    156       58      547      6.24       .85      .62    10.95
         11    160       58      258      3.44      1.58     1.11    12.35
         12    156       58      325      0.00         *        *        *
         13    176       44      270      0.00         *        *        *

        CYCLE COMPOSITE    BSHC  =   .979  GRAM/BHP HR
                           BSCO  = 10.197  GRAM/BHP HR
                           BSNO2 = 11.728  GRAM/BHP HR
                    BSHC + BSNO2 = 12.707  GRAM/BHP HR
                           BSFC  =   .478    LB/BHP HR
```

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                  13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-41.  13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 3   8-15-72
         BUS NO. 707  TEST MILES' 77841  LOW INJECTORS + STOCK MUFFLER
     ==============================================================
     MODE  ENGINE   REAR    FLY-    FUEL     AIR     EXHAUST   FUEL
           SPEED    WHEEL   WHEEL   FLOW     FLOW    FLOW      AIR
            RPM     BHP     BHP    LB/MIN   LB/MIN   LB/MIN    RATIO
     ==============================================================
       1     500      0       0      .04     12.92    12.96     .003
       2    1000      0       0      .14     20.57    20.71     .007
       3    1000     10      27      .22     20.57    20.79     .011
       4    1000     30      56      .37     20.38    20.75     .018
       5    1000     52      81      .53     20.35    20.88     .026
       6    1000     82     106      .74     20.35    21.09     .036
       7     480      0       0      .05     12.92    12.97     .004
       8    1600    113     158     1.05     34.01    35.05     .031
       9    1600     82     119      .77     33.95    34.72     .023
      10    1600     52      78      .55     33.95    34.50     .016
      11    1600     10      45      .38     33.97    34.35     .011
      12    1600      0       0      .35     34.32    34.67     .010
      13     480      0       0      .05     12.92    12.97     .004


     ===================================================================
     MODE    HC      CO      NO     WEIGHTED   BSHC      BSCO     BSNO2

             PPM     PPM     PPM      BHP     G/HP HR   G/HP HR  G/HP HR
     ===================================================================
       1     184     120     298      0.00       N         N         N
       2     166     134     217      0.00       N         N         N
       3     164     107     392      2.16     1.67      2.17     14.09
       4     164     107     649      4.48      .80      1.04     10.89
       5     174     133    1002      6.48      .59      2.49     11.16
       6     168    8057     969      8.48      .49     42.16      7.46
       7     170     107     202      0.00       N         N         N
       8     190    1767    1080     12.64      .41     10.81     10.86
       9     192     107     970      9.52      .55       .80     12.26
      10     192      67     620      6.24      .83       .78     11.66
      11     190      53     381      3.60     1.41      1.06     12.57
      12     190      67     297      0.00       N         N         N
      13     184     107     281      0.00       N         N         N

     CYCLE COMPOSITE    BSHC  =   .539   GRAM/BHP HR
                        BSCO  = 10.222   GRAM/BHP HR
                        BSNO2 = 12.789   GRAM/BHP HR
                 BSHC + BSNO2 = 13.328   GRAM/BHP HR
                        BSFC  =   .468     LB/BHP HR
```

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                   13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-42. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1   2-18-78
          BUS NO. 707   TEST MILES' 77841   8 INJECTORS + STOCK MUFFLER
=========================================================================
MODE  ENGINE   REAR    FLY-     FUEL     AIR    EXHAUST   FUEL
      SPEED    WHEEL   WHEEL    FLOW     FLOW    FLOW     AIR
       RPM      BHP     BHP    LB/MIN   LB/MIN  LB/MIN   RATIO
=========================================================================
  1     480      0       0      .04     12.92   12.96    .003
  2    1000      0       0      .17     20.57   20.74    .008
  3    1000     10      30      .25     20.56   20.81    .012
  4    1000     35      52      .37     20.37   20.74    .018
  5    1000     58      77      .52     20.36   20.88    .026
  6    1000     76     101      .74     20.86   21.06    .035
  7     480      0       0      .06     12.92   12.97    .005
  8    1600    106     154     1.03     33.94   34.97    .030
  9    1600     75     116      .79     33.90   34.69    .023
 10    1600     48      80      .57     33.90   34.47    .017
 11    1600      5      40      .38     34.26   34.64    .011
 12    1600      0       0      .40     34.25   34.65    .012
 13     480      0       0      .06     12.92   12.97    .004



=========================================================================
MODE   HC       CO      NO     WEIGHTED   BSHC     BSCO     BSNO2

       PPM      PPM     PPM      BHP     G/HP HR  G/HP HR  G/HP HR
=========================================================================
  1    576      161     206      0.00       N        N        N
  2   1056      215     206      0.00       N        N        N
  3   1600      188     381      2.40     14.65     0.40    11.42
  4   1469      174     572      4.16      7.71     1.82     9.86
  5   1916      203     912      6.16      5.07     2.02    10.59
  6   1288     3759    1033      8.08      3.54    20.55     9.30
  7    690      161     238      0.00       N        N        N
  8   1312     1117    1155     12.32      3.90     6.51    11.19
  9   1800      161     957      9.28      5.21     1.27    12.86
 10   1076      153     912      6.40      7.83     1.52    16.97
 11   1600      147     381      3.20     14.25     3.35    19.26
 12   1535      161     381      0.00       N        N        N
 13    520      174     248      0.00       N        N        N

CYCLE COMPOSITE     BSHC  =  8.295  GRAM/BHP HR
                    BSCO  =  6.552  GRAM/BHP HR
                    BSNO2 = 13.523  GRAM/BHP HR
             BSHC + BSNO2 = 21.818  GRAM/BHP HR
                    BSFC  =   .491    LB/BHP HR
```

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-45. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 2 2-10-78
BUS NO. 707 TEST MILES: 77841 5 INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	480	0	0	.04	12.35	12.39	.003
2	1000	0	0	.15	20.57	20.72	.007
3	1000	10	28	.24	20.58	20.82	.012
4	1000	35	58	.37	20.37	20.75	.018
5	1000	58	77	.51	20.36	20.86	.025
6	1000	78	101	.71	20.30	21.03	.035
7	480	0	0	.05	12.92	12.97	.004
8	1600	108	155	1.04	33.94	34.98	.031
9	1600	75	119	.77	33.93	34.70	.023
10	1600	42	78	.57	33.94	34.51	.017
11	1600	6	42	.40	34.26	34.66	.012
12	1600	0	0	.40	34.29	34.69	.012
13	480	0	0	.04	12.92	12.96	.003

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	550	197	217	0.00	H	H	H
2	1104	188	217	0.00	H	H	H
3	1629	179	415	2.24	15.94	3.40	10.83
4	1504	179	662	4.16	7.92	1.82	11.90
5	1716	242	1018	6.16	5.06	1.72	11.91
6	1160	3627	1195	8.08	3.21	19.86	10.80
7	688	179	259	0.00	H	H	H
8	1440	1169	1696	12.40	4.24	6.91	12.64
9	1408	197	1018	9.12	3.66	1.18	10.29
10	1492	188	967	6.24	3.13	1.56	10.29
11	1720	188	904	3.96	10.82	2.41	14.40
12	1720	184	904	0.00	H	H	H
13	608	161	259	0.00	H	H	H

CYCLE COMPOSITE BSHC = 8.765 GRAM/BHP HR
BSCO = 6.499 GRAM/BHP HR
BSNO2 = 14.815 GRAM/BHP HR
BSHC + BSNO2 = 23.579 GRAM/BHP HR
BSFC = .489 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-44. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1   2-18-78
BUS NO. 707   TEST MILES' 77891   8 INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	580	0	0	.04	12.92	12.96	.003
2	1000	0	0	.15	20.56	20.71	.007
3	1000	11	28	.24	20.59	20.83	.012
4	1000	36	52	.37	20.37	20.74	.018
5	1000	58	74	.51	20.36	20.87	.025
6	1000	76	101	.71	20.35	21.06	.035
7	580	0	0	.04	12.92	12.96	.003
8	1600	110	157	1.03	33.93	34.96	.030
9	1600	75	116	.78	33.92	34.70	.023
10	1600	43	80	.58	33.90	34.48	.017
11	1600	6	40	.39	34.28	34.67	.011
12	1600	0	0	.40	34.29	34.69	.012
13	580	0	0	.05	12.92	12.97	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	576	161	298	0.00	0	0	0
2	1088	188	298	0.00	0	0	0
3	1632	174	562	2.24	16.03	3.40	19.85
4	1980	161	742	4.16	7.84	1.59	12.79
5	1924	216	1096	5.94	5.30	1.59	12.35
6	1925	3690	1211	8.08	3.92	20.73	10.91
7	608	157	292	0.00	0	0	0
8	1376	1107	1367	12.32	3.12	5.51	12.91
9	1376	157	1080	9.28	3.34	1.16	12.96
10	1924	180	729	6.40	8.10	1.36	12.57
11	1712	180	327	3.20	19.55	2.74	16.59
12	1728	180	315	0.00	0	0	0
13	648	139	270	0.00	0	0	0

CYCLE COMPOSITE   BSHC = 8.813 GRAM/BHP HR
BSCO = 6.289 GRAM/BHP HR
BSNO2 = 15.199 GRAM/BHP HR
BSHC + BSNO2 = 24.012 GRAM/BHP HR
BSFC = .441 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-45. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 11-19-72
BUS NO. 702 TEST MILES' 109492 LSN INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	650	0	0	.07	12.90	12.99	.005
2	1000	0	0	.15	20.80	20.95	.007
3	1000	8	27	.22	20.80	21.02	.011
4	1000	33	51	.35	20.68	21.03	.017
5	1000	54	73	.49	20.56	21.05	.024
6	1000	71	96	.65	20.40	21.05	.032
7	650	0	0	.06	12.90	12.99	.005
8	1600	99	137	.89	34.97	35.86	.026
9	1600	71	109	.71	34.92	35.63	.021
10	1600	42	69	.50	34.68	35.18	.015
11	1600	5	36	.35	35.56	35.90	.010
12	1600	0	0	.34	35.08	35.42	.010
13	650	0	0	.07	12.96	13.03	.005

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	126	128	155	0.00	*	*	*
2	122	176	135	0.00	*	*	*
3	108	75	292	2.16	1.11	1.59	9.82
4	116	38	450	4.08	.63	.41	8.02
5	139	88	572	5.84	.51	.67	7.12
6	156	1566	659	7.68	.45	9.03	6.16
7	118	126	156	0.00	*	*	*
8	136	383	610	10.96	.46	2.60	6.80
9	118	50	515	8.72	.50	.49	7.47
10	108	38	358	5.52	.72	.51	7.89
11	110	62	228	2.88	1.42	1.60	10.08
12	112	52	238	0.00	*	*	*
13	150	126	135	0.00	*	*	*

CYCLE COMPOSITE BSHC = .842 GRAM/BHP HR
BSCO = 2.905 GRAM/BHP HR
BSNO2 = 8.608 GRAM/BHP HR
BSHC + BSNO2 = 9.451 GRAM/BHP HR
BSFC = .581 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-46. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 2 11-19-78
BUS NO. 702 TEST MILES: 109990 LOW INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	550	0	0	.06	12.96	13.02	.005
2	1000	0	0	.18	20.80	20.98	.006
3	1000	0	28	.23	20.75	20.97	.011
4	1000	23	50	.35	20.68	21.03	.017
5	1000	55	73	.48	20.55	21.03	.023
6	1000	70	96	.64	20.47	21.11	.031
7	550	0	0	.06	12.92	12.98	.005
8	1600	96	128	.85	24.97	25.82	.034
9	1600	74	108	.70	25.17	25.87	.028
10	1600	48	75	.51	25.30	25.81	.020
11	1600	9	26	.31	25.58	25.89	.012
12	1600	0	0	.23	25.10	25.32	.010
13	550	0	0	.06	12.96	13.02	.005

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	132	151	155	0.00	N	N	N
2	132	169	180	0.00	N	N	N
3	128	88	250	2.24	1.21	1.78	9.45
4	128	90	450	4.16	.60	.58	7.86
5	130	119	667	5.84	.37	.86	7.42
6	170	1607	675	7.68	.44	4.91	6.91
7	126	106	213	0.00	N	N	N
8	152	359	610	11.04	.31	2.82	6.28
9	138	62	597	8.64	.37	.38	7.28
10	126	50	381	6.00	.48	.65	8.15
11	128	75	255	2.08	1.66	1.49	10.98
12	132	95	258	0.00	N	N	N
13	164	188	148	0.00	N	N	N

CYCLE COMPOSITE BSHC = .591 GRAM/BHP HR
BSCO = 2.082 GRAM/BHP HR
BSNO2 = 8.179 GRAM/BHP HR
BSHC + BSNO2 = 8.770 GRAM/BHP HR
BSFC = .470 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-47. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 11-17-72
BUS NO. 708 TEST MILES 104492 5 INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	550	0	0	.07	18.92	18.99	.004
2	1000	0	0	.14	20.80	20.94	.007
3	1000	11	26	.28	20.80	21.08	.013
4	1000	29	56	.40	20.72	21.12	.019
5	1000	51	81	.55	20.56	21.11	.027
6	1000	70	101	.71	20.40	21.11	.035
7	550	0	0	.05	18.92	18.97	.003
8	1600	95	151	1.02	34.96	35.98	.029
9	1600	74	117	.79	34.79	35.58	.023
10	1600	51	90	.62	34.75	35.37	.018
11	1600	5	46	.37	34.84	35.21	.011
12	1600	0	0	.41	34.96	35.37	.012
13	550	0	0	.08	18.92	19.00	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	500	176	195	0.00	*	*	*
2	625	252	155	0.00	*	*	*
3	1072	108	308	2.88	8.05	0.13	3.06
4	1648	113	458	4.48	8.20	1.12	8.11
5	1360	165	662	6.48	4.58	1.12	7.40
6	1425	1527	702	8.08	3.94	10.60	6.39
7	980	106	186	0.00	*	*	*
8	1800	565	688	12.08	4.72	4.58	7.00
9	1240	88	623	9.36	4.44	.70	8.17
10	1296	75	506	7.20	6.72	.70	8.06
11	1498	151	248	2.88	17.47	4.88	10.48
12	1450	188	253	0.00	*	*	*
13	808	188	165	0.00	*	*	*

CYCLE COMPOSITE BSHC = 7.456 GRAM/BHP HR
BSCO = 2.810 GRAM/BHP HR
BSNO2 = 8.853 GRAM/BHP HR
BSHC + BSNO2 = 16.309 GRAM/BHP HR
BSFC = .491 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-48. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 2 11-17-78
BUS NO. 702 TEST MILES 109492 N INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY- WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	550	0	0	.06	18.96	19.02	.003
2	1000	0	0	.15	20.80	20.95	.007
3	1000	11	31	.26	20.76	21.02	.012
4	1000	29	48	.39	20.72	21.11	.019
5	1000	51	75	.50	20.66	21.16	.024
6	1000	78	101	.71	20.56	21.27	.035
7	550	0	0	.08	18.96	19.04	.004
8	1600	100	156	1.05	24.50	25.55	.043
9	1600	79	119	.77	24.58	25.35	.031
10	1600	51	86	.52	24.98	25.50	.021
11	1600	6	33	.36	24.98	25.34	.014
12	1600	0	0	.41	25.06	25.47	.016
13	550	0	0	.07	18.93	19.00	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	280	169	155	0.00	0	0	0
2	652	292	135	0.00	0	0	0
3	976	169	247	2.48	8.28	2.92	10.16
4	1020	188	575	3.84	7.20	1.85	7.86
5	1096	169	662	6.00	4.89	1.29	8.18
6	1288	2013	788	8.08	4.65	11.15	6.62
7	900	169	178	0.00	0	0	0
8	1109	609	715	12.48	3.80	4.65	7.09
9	1168	118	680	9.52	4.89	.98	8.99
10	1216	117	575	6.88	6.61	1.28	8.99
11	1076	109	250	2.64	19.95	6.38	11.97
12	1404	176	205	0.00	0	0	0
13	980	169	178	0.00	0	0	0

CYCLE COMPOSITE BSHC = 7.253 GRAM/BHP HR
BSCO = 4.329 GRAM/BHP HR
BSNO2 = 9.137 GRAM/BHP HR
BSHC + BSNO2 = 16.390 GRAM/BHP HR
BSFC = .556 LB/BHP HR

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               13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-49.  13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 1 10-31-78
         BUS NO. 704  TEST MILES: 117639 LOW INJECTORS + STOCK MUFFLER
=========================================================================
MODE  ENGINE   REAR    FLY-    FUEL     AIR    EXHAUST   FUEL
      SPEED    WHEEL   WHEEL   FLOW     FLOW    FLOW     AIR
       RPM     BHP     BHP    LB/MIN   LB/MIN  LB/MIN    RATIO
=========================================================================
  1     550      0       0     .09     18.82   18.87     .005
  2    1000      0       0     .11     20.26   20.37     .006
  3    1000      8      17     .15     20.20   20.35     .009
  4    1000     33      47     .34     20.08   20.42     .017
  5    1000     55      70     .49     20.10   20.58     .024
  6    1000     68      95     .65     20.00   20.65     .032
  7     550      0       0     .09     18.82   18.87     .005
  8    1600     96     137     .90     33.86   34.08     .026
  9    1600     70      96     .67     33.92   34.05     .020
 10    1600     37      67     .46     33.56   34.02     .014
 11    1600  [illegible] 40    .31     33.66   33.97     .009
 12    1600      0       0     .28     33.88   34.20     .010
 13     550      0       0     .07     18.82   18.89     .005




=========================================================================
MODE    HC      CO      NO     WEIGHTED    BSHC     BSCO     BSNO2

        PPM     PPM     PPM      BHP      G/HP HR  G/HP HR  G/HP HR
=========================================================================
  1     128     185     155      0.00        N        N        N
  2     180     266     135      0.00        N        N        N
  3     156     138     221      1.36      2.47     4.80    14.56
  4     168      88     558      3.76       .56     1.01     9.25
  5     218     202     703      5.60       .85     1.56     9.94
  6     320    5922     783      7.60       .58    21.00     7.85
  7     144     176     206      0.00        N        N        N
  8     220     650     841     10.96       .29     4.28     9.08
  9     154      98     660      7.68       .28      .80    10.16
 10     128      38     527      5.36       .86      .51     9.87
 11     132      88     265      3.20      1.58     1.57     9.60
 12     136      60     270      0.00        N        N        N
 13     150     181     196      0.00        N        N        N

CYCLE COMPOSITE     BSHC   =  1.226  GRAM/BHP HR
                    BSCO   =  7.573  GRAM/BHP HR
                    BSNO2  = 10.686  GRAM/BHP HR
             BSHC + BSNO2  = 11.912  GRAM/BHP HR
                    BSFC   =   .486    LB/BHP HR
                    13-MODE CALIF.  DIESEL EMISSION CYCLE

TABLE D-50. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2 10-21-79
            BUS NO. 709  TEST MILES 117639 LOW INJECTORS + STUCK MUFFLER
     ==================================================================
     MODE  ENGINE  REAR    FLY-    FUEL    AIR    EXHAUST  FUEL
           SPEED   WHEEL   WHEEL   FLOW    FLOW    FLOW    AIR
            RPM     BHP     BHP   LB/MIN  LB/MIN  LB/MIN   RATIO
     ==================================================================
       1    550      0       0      .07   12.80   12.87    .006
       2   1000      0       0      .19   20.26   20.50    .007
       3   1000      8      17      .19   20.18   20.37    .009
       4   1000     33      47      .39   20.08   20.58    .017
       5   1000     55      75      .51   20.04   20.65    .026
       6   1000     68      96      .66   19.98   20.64    .033
       7    550      0       0      .09   12.80   12.87    .007
       8   1600     96     133      .89   38.90   39.69    .023
       9   1600     70      96      .67   38.98   39.19    .020
      10   1600     37      67      .47   38.60   39.07    .015
      11   1600      9      22      .31   38.79   39.06    .009
      12   1600      0       0      .30   38.58   38.76    .010
      13    550      0       0      .07   12.80   12.87    .006




     ==================================================================
     MODE   HC      CO      NO    WEIGHTED   BSHC     BSCO     BSNO2

            PPM     PPM     PPM     BHP     G/HP HR  G/HP HR  G/HP HR
     ==================================================================
       1    175     251     155     0.00       0        0        0
       2    186     252     145     0.00       0        0        0
       3    172     176     258     1.36     2.70     5.55    15.11
       4    188     188     567     3.76     1.08     1.58    10.07
       5    235     868     865     6.00      .86     1.80    10.11
       6    280    4575     855     7.68      .91    26.87     9.43
       7    170     251     217     0.00       0        0        0
       8    232     785     897    10.64      .29     5.18     9.55
       9    172     100     702     7.68      .81      .94    10.29
      10    158      88     938     5.36     1.17     1.08    11.31
      11    182     138     270     1.76     5.14     6.68    18.05
      12    160     138     270     0.00       0        0        0
      13    178     202     206     0.00       0        0        0
     CYCLE COMPOSITE    BSHC  =  1.901   GRAM/BHP HR
                        BSCO  =  7.806   GRAM/BHP HR
                        BSNO2 = 11.890   GRAM/BHP HR
                 BSHC + BSNO2 = 13.791   GRAM/BHP HR
                        BSFC  =   .516     LB/BHP HR
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13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-51. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 11-8-78
BUS NO. 704 TEST MILES 117639 9 INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY- WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	550	0	0	.06	18.92	18.98	.003
2	1000	0	0	.16	20.80	20.96	.008
3	1000	7	23	.22	20.26	20.48	.011
4	1000	31	52	.37	20.20	20.57	.018
5	1000	55	78	.53	20.08	20.61	.026
6	1000	76	101	.71	19.95	20.66	.036
7	550	0	0	.06	18.86	18.92	.003
8	1600	112	155	1.05	33.85	34.90	.031
9	1600	81	117	.75	33.73	34.48	.022
10	1600	58	80	.58	33.44	34.02	.017
11	1600	10	36	.38	33.62	34.00	.011
12	1600	0	0	.40	33.76	34.16	.012
13	550	0	0	.08	18.86	18.94	.004

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	590	266	196	0.00	*	*	*
2	555	357	195	0.00	*	*	*
3	1192	274	292	1.84	12.69	5.59	11.29
4	2155	218	522	4.16	11.20	2.29	8.50
5	1696	253	811	6.24	9.91	1.76	9.80
6	1920	1008	947	8.08	5.18	17.79	8.15
7	625	291	296	0.00	*	*	*
8	1680	1081	1002	12.40	9.52	6.81	9.61
9	1585	176	811	9.36	6.12	1.86	10.28
10	1600	186	960	6.40	8.58	1.31	10.29
11	1728	202	302	2.88	21.65	6.02	12.92
12	1696	189	309	0.00	*	*	*
13	705	215	196	0.00	*	*	*

CYCLE COMPOSITE BSHC = 9.572 GRAM/BHP HR
BSCO = 6.507 GRAM/BHP HR
BSNO2 = 11.079 GRAM/BHP HR
BSHC + BSNO2 = 20.651 GRAM/BHP HR
BSFC = .500 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-52. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 2 11-8-78
BUS NO. 704 TEST MILES 117635 N INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	550	0	0	.07	12.58	12.55	.006
2	1000	0	0	.15	20.82	20.97	.007
3	1000	7	29	.22	20.29	20.96	.011
4	1000	21	55	.38	20.20	20.65	.019
5	1000	56	77	.52	20.08	20.60	.026
6	1000	79	100	.70	19.56	20.66	.036
7	550	0	0	.06	12.42	12.50	.005
8	1600	118	154	1.03	33.90	34.93	.031
9	1600	81	117	.75	33.98	34.07	.024
10	1600	58	80	.58	33.52	34.10	.017
11	1600	10	35	.37	33.65	34.01	.011
12	1600	0	0	.20	33.75	34.15	.010
13	550	0	0	.08	12.89	12.90	.006

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	576	279	186	0.00	M	M	M
2	912	257	165	0.00	M	M	M
3	1105	279	250	1.90	18.90	6.05	10.75
4	2208	251	547	5.32	11.11	2.55	9.01
5	1710	331	803	6.16	5.08	2.38	10.21
6	1070	2526	1008	8.00	5.11	15.16	8.95
7	609	266	217	0.00	M	M	M
8	1710	1167	1080	12.32	5.05	6.86	10.92
9	1640	202	868	5.96	5.31	1.56	10.98
10	1665	169	886	6.50	5.36	1.08	10.77
11	1760	216	890	2.80	22.61	6.45	12.06
12	1956	176	325	0.00	M	M	M
13	704	228	196	0.00	M	M	M

CYCLE COMPOSITE BSHC = 9.805 GRAM/BHP HR
BSCO = 7.069 GRAM/BHP HR
BSNO2 = 11.719 GRAM/BHP HR
BSHC + BSNO2 = 21.524 GRAM/BHP HR
BSFC = .458 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-55. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 11-7-78
BUS NO. 707 TEST MILES' 118838 LBN INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	585	0	0	.06	12.84	12.90	.005
2	1000	0	0	.19	20.80	20.99	.009
3	1000	10	24	.21	20.28	20.49	.010
4	1000	20	47	.33	20.14	20.47	.016
5	1000	52	74	.52	20.07	20.59	.026
6	1000	70	101	.69	19.98	20.67	.035
7	585	0	0	.06	12.84	12.90	.005
8	1600	100	147	.96	33.80	34.76	.028
9	1600	76	118	.77	33.94	34.71	.023
10	1600	52	74	.53	33.98	34.51	.016
11	1600	10	40	.34	34.06	34.40	.010
12	1600	0	0	.37	34.18	34.55	.011
13	585	0	0	.07	12.84	12.91	.005

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	290	258	196	0.00	*	*	*
2	212	258	217	0.00	*	*	*
3	212	170	369	1.90	8.80	3.50	11.87
4	210	184	572	3.75	1.21	1.84	10.76
5	240	201	967	6.22	.83	1.58	10.72
6	246	3335	1080	8.08	.49	17.46	9.56
7	254	251	206	0.00	*	*	*
8	262	680	1080	11.76	.32	4.29	11.08
9	218	85	952	9.94	.38	.65	11.97
10	192	85	978	6.92	1.18	1.05	11.90
11	194	184	347	3.20	2.20	4.03	12.89
12	198	184	358	0.00	*	*	*
13	264	336	206	0.00	*	*	*

CYCLE COMPOSITE BSHC = 1.166 GRAM/BHP HR
BSCO = 5.575 GRAM/BHP HR
BSNO2 = 12.893 GRAM/BHP HR
BSHC + BSNO2 = 14.059 GRAM/BHP HR
BSFC = .478 LB/BHP HR

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                     13-MODE CALIF.  DIESEL EMISSION CYCLE
TABLE D-54.  13 MODE CYCLE BRAKE SPECIFIC EMISSIONS   TEST NO. 2 11-7-78
             BUS NO. 707  TEST MILES' 118232 LSN INJECTORS + STOCK MUFFLER
       ================================================================
       MODE  ENGINE  REAR   FLY-    FUEL    AIR    EXHAUST  FUEL
             SPEED   WHEEL  WHEEL   FLOW    FLOW    FLOW    AIR
              RPM     BHP    BHP   LB/MIN  LB/MIN  LB/MIN   RATIO
       ================================================================
         1    525      0      0     .06    12.89   12.90    .005
         2   1000      0      0     .17    20.36   20.50    .007
         3   1000     10     25     .21    20.26   20.47    .010
         4   1000     31     53     .34    20.19   20.98    .017
         5   1000     52     79     .50    20.10   20.62    .026
         6   1000     72    101     .65    20.00   20.69    .034
         7    525      0      0     .07    12.89   12.91    .005
         8   1600    100    147     .96    33.89   34.79    .028
         9   1600     75    110     .79    33.94   34.69    .022
        10   1600     48     75     .53    35.00   35.53    .016
        11   1600      8     36     .39    35.06   35.40    .010
        12   1600      0      0     .37    35.19   35.51    .011
        13    525      0      0     .07    12.84   12.91    .005


       ================================================================
       MODE   HC      CO      NO    WEIGHTED   BSHC     BSCO    BSNO2

              PPM     PPM     PPM     BHP    G/HP HR  G/HP HR  G/HP HR
       ================================================================
         1    244     241     206     0.00      M        M        M
         2    210     068     227     0.00      M        M        M
         3    240     156     404     2.00     8.87     3.36    14.28
         4    240     109     628     4.24     1.16     1.47    11.88
         5    246     219    1055     6.32      .80     2.16    11.80
         6    196    3081    1112     8.08      .49    17.67     9.94
         7    246     251     281     0.00      M        M        M
         8    200     653    1155    11.76      .81     4.09    11.71
         9    212      89     827     8.80      .84      .71    10.70
        10    152      67     885     6.00     1.47      .81    11.69
        11    156     139     956     2.88     3.47     4.92    18.87
        12    200     189     358     0.00      M        M        M
        13    268     319     206     0.00      M        M        M
       CYCLE COMPOSITE     BSHC  =  1.478  GRAM/BHP HR
                           BSCO  =  5.577  GRAM/BHP HR
                           BSNO2 = 13.122  GRAM/BHP HR
                    BSHC + BSNO2 = 14.600  GRAM/BHP HR
                           BSFC  =   .480    LB/BHP HR
```

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-55. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 1 11-10-78
BUS NO. 707 TEST MILES: 118232 S INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	525	0	0	.08	12.90	13.00	.006
2	1000	0	0	.14	20.38	20.52	.007
3	1000	6	26	.23	20.26	20.49	.011
4	1000	26	55	.37	20.12	20.49	.019
5	1000	45	79	.50	20.09	20.59	.025
6	1000	62	100	.68	19.94	20.62	.034
7	525	0	0	.07	12.92	12.99	.006
8	1600	91	148	1.01	33.80	34.81	.030
9	1600	65	121	.79	33.88	34.67	.023
10	1600	37	83	.57	33.98	34.56	.017
11	1600	6	46	.35	34.10	34.45	.011
12	1600	0	0	.39	34.22	34.61	.011
13	525	0	0	.09	12.92	13.01	.007

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	656	228	215	0.00	M	M	M
2	896	240	229	0.00	M	M	M
3	1200	184	304	2.00	12.98	4.07	14.00
4	1584	202	562	4.90	7.79	1.98	10.66
5	1488	266	1002	6.00	5.38	1.98	11.89
6	1760	3040	1112	8.00	4.79	16.45	9.91
7	696	202	274	0.00	M	M	M
8	1776	814	1914	11.84	3.81	3.09	12.08
9	1948	198	1128	9.68	3.63	1.09	12.56
10	1982	100	756	6.64	3.18	1.05	12.60
11	1698	138	950	3.68	16.91	2.72	14.58
12	1600	186	950	0.00	M	M	M
13	780	184	813	0.00	M	M	M

CYCLE COMPOSITE BSHC = 8.980 GRAM/BHP HR
BSCO = 5.878 GRAM/BHP HR
BSNO2 = 14.542 GRAM/BHP HR
BSHC + BSNO2 = 23.522 GRAM/BHP HR
BSFC = .488 LB/BHP HR

13-MODE CALIF. DIESEL EMISSION CYCLE

TABLE D-56. 13 MODE CYCLE BRAKE SPECIFIC EMISSIONS TEST NO. 2 11-10-72
BUS NO. 707 TEST MILES 118232 8 INJECTORS + STOCK MUFFLER

MODE	ENGINE SPEED RPM	REAR WHEEL BHP	FLY-WHEEL BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	EXHAUST FLOW LB/MIN	FUEL AIR RATIO
1	525	0	0	.08	12.92	13.00	.006
2	1000	0	0	.14	20.38	20.52	.007
3	1000	5	28	.22	20.32	20.55	.011
4	1000	26	54	.36	20.16	20.52	.018
5	1000	55	72	.48	20.10	20.58	.024
6	1000	69	102	.69	20.02	20.71	.034
7	525	0	0	.07	12.92	12.99	.006
8	1600	92	152	.99	32.78	33.77	.029
9	1600	69	116	.75	33.09	33.84	.023
10	1600	37	82	.56	33.98	34.54	.017
11	1600	6	48	.40	34.10	34.50	.012
12	1600	0	0	.35	34.20	34.55	.010
13	525	0	0	.08	12.92	13.00	.006

MODE	HC PPM	CO PPM	NO PPM	WEIGHTED BHP	BSHC G/HP HR	BSCO G/HP HR	BSNO2 G/HP HR
1	576	290	259	0.00	0	0	0
2	864	290	238	0.00	0	0	0
3	1216	189	415	2.24	11.70	3.65	17.16
4	1600	189	675	4.32	8.03	1.89	11.08
5	1508	290	1069	5.76	5.61	1.80	10.19
6	1776	2001	1295	8.16	4.76	14.96	10.42
7	640	228	232	0.00	0	0	0
8	1840	852	1317	12.16	5.86	5.07	12.81
9	1988	130	1128	9.28	5.86	1.08	14.52
10	1956	113	792	6.56	8.10	1.88	13.50
11	1680	151	430	3.84	18.49	2.80	14.60
12	1680	169	426	0.00	0	0	0
13	736	288	206	0.00	0	0	0

CYCLE COMPOSITE BSHC = 5.002 GRAM/BHP HR
BSCO = 5.211 GRAM/BHP HR
BSNO2 = 15.877 GRAM/BHP HR
BSHC + BSNO2 = 20.879 GRAM/BHP HR
BSFC = .577 LB/BHP HR

APPENDIX E

EFFECT OF DF-1 AND DF-2 DIESEL FUELS ON EMISSIONS

TABLE E-1. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: August 3, 1971

Test Configuration: L8N Injectors,
Stock Muffler
Fuel: EM-166-F (No. 2 Diesel - Local)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
2.	900 rpm	2.7	1.0	0.9	0.8	0.2
7.	24 mph	2.6	1.0	0.7	0.8	0.2
9.	1/2 load*	3.6	0.9	0.9	0.9	1.0
15.		2.8	1.0	0.9	0.6	0.4
		2.9	1.0	0.9	0.8	0.5
3.	1200 rpm	3.0	1.0	0.9	0.8	0.3
5.	32 mph	2.6	1.0	0.8	0.6	0.1
10.	1/2 load	2.7	0.9	0.7	0.8	0.1
16.		3.0	1.0	0.8	0.7	0.2
		2.8	1.0	0.8	0.7	0.2
4.	1500 rpm	3.0	1.0	0.9	0.6	0.4
8.	40 mph	3.1	1.0	0.9	0.7	0.6
12.	1/2 load	3.9	1.0	1.0	0.9	0.9
14.		3.2	1.0	0.9	0.7	0.7
		3.3	1.0	0.9	0.7	0.7
1.	Idle	3.0	1.0	0.7	0.7	0.4
6.		3.3	1.0	0.9	0.9	0.7
11.		2.8	1.0	0.9	0.6	0.3
13.		3.2	1.0	0.7	0.7	0.4
		3.1	1.0	0.8	0.7	0.5
18.	Idle-Acceleration	4.3	1.2	1.0	1.0	0.9
20.		3.8	1.0	1.0	0.8	1.0
21.		4.1	1.1	1.1	0.9	0.9
22.		3.8	1.0	1.0	0.9	0.8
		4.0	1.1	1.0	0.9	0.9
17.	Deceleration	2.9	1.0	0.7	0.8	0.4
19.		3.1	1.0	0.8	0.6	0.4
23.		3.1	0.8	0.7	0.6	0.4
24.		2.4	0.9	0.6	0.8	0.2
		2.9	0.9	0.7	0.7	0.4

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

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TABLE E-2. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: August 4, 1971

Test Configuration: LSN Injectors,
Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
1.	900 rpm	2.8	1.0	0.7	0.7	0.6
8.	24 mph	2.3	0.9	0.8	0.6	0.2
11.	1/2 load*	2.9	1.0	0.8	0.8	0.4
16.		2.9	1.0	0.9	1.0	0.3
		2.7	1.0	0.8	0.8	0.4
4.	1200 rpm	2.3	0.9	0.7	0.4	0.1
5.	32 mph	2.0	0.9	0.7	0.3	0.1
12.	1/2 load	2.1	0.9	0.6	0.7	0.1
13.		2.6	1.0	0.7	0.9	0.2
		2.3	0.9	0.7	0.6	0.1
2.	1500 rpm	2.8	0.9	1.0	0.6	0.4
7.	40 mph	3.1	1.1	0.9	0.7	0.7
10.	1/2 load	3.7	1.1	1.0	0.9	0.6
15.		2.9	1.0	1.0	0.8	0.2
		3.1	1.0	1.0	0.8	0.5
3.	Idle	3.4	1.1	1.0	0.9	0.4
6.		2.8	0.9	0.8	0.4	0.7
9.		3.2	1.0	0.9	0.7	0.6
14.		3.4	1.0	0.9	0.9	0.4
		3.2	1.0	0.9	0.7	0.5
19.	Idle-Acceleration	4.0	1.0	1.0	1.0	0.9
20.		4.4	1.4	1.0	0.9	0.8
21.		4.0	1.2	1.0	1.0	0.8
24.		3.3	1.0	0.8	1.0	0.7
		3.9	1.2	1.0	1.0	0.8
17.	Deceleration	3.2	1.0	0.9	0.6	0.7
18.		2.7	0.9	0.8	0.7	0.2
22.		3.0	1.0	1.0	0.7	0.4
23.		2.7	1.0	0.9	0.8	0.3
		2.9	1.0	0.9	0.7	0.4

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE E-1. VEHICLE ODOR EVALUATION SUMMARY

Vehicle: Bus 704
Date: August 6, 1971

Fuel: EM-139-F (No. 2 Diesel,
Chicago Area)

Run No.	Operating Conditions	"D" Composite	"B" Burnt	"O" Oily	"A" Aromatic	"P" Pungent
4.	900 rpm	4.8	1.6	1.1	1.0	0.8
8.	24 mph	4.7	1.6	1.1	1.0	0.9
12.	1/2 load*	3.7	1.2	1.0	0.9	0.6
14.		4.3	1.3	1.0	1.0	0.9
		4.4	1.4	1.1	1.0	0.8
3.	1200 rpm	4.2	1.1	1.1	1.0	0.8
7.	32 mph	5.3	1.5	1.2	1.0	0.7
11.	1/2 load	3.6	1.0	1.0	0.9	0.6
13.		4.6	1.3	1.2	1.0	0.9
		4.4	1.3	1.1	1.0	0.8
2.	1500 rpm	3.4	1.0	1.1	0.9	0.5
5.	40 mph	4.2	1.2	1.0	1.0	0.9
10.	1/2 load	4.2	1.2	1.0	1.0	1.0
16.		3.9	1.2	1.0	1.0	0.6
		3.9	1.2	1.0	1.0	0.8
1.	Idle	4.3	1.1	1.3	0.8	1.0
6.		4.1	1.2	1.1	0.9	0.9
9.		5.0	1.6	1.1	1.0	1.1
15.		4.1	1.3	0.9	0.8	1.0
		4.4	1.3	1.1	0.9	1.0
19.	Idle-Acceleration	4.4	1.3	1.0	1.0	1.0
20.		4.5	1.5	1.0	1.0	1.0
23.		4.1	1.2	1.1	0.8	0.8
24.		4.0	1.1	1.0	1.0	0.9
		4.3	1.3	1.0	1.0	0.9
17.	Deceleration	2.9	1.0	0.8	0.8	0.3
18.		2.9	1.0	1.0	0.5	0.4
21.		2.3	1.0	0.7	0.4	0.3
22.		2.6	0.9	0.8	0.4	0.3
		2.7	1.0	0.8	0.5	0.3

*Engine operated at a fuel rate midway between maximum and no load fuel rate.

TABLE E-4. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: August [illegible], 1971

Test Configuration: [illegible]
Fuel: [illegible]

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes,* ppm
900 rpm 20 mph 1/2 load†	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm 30 mph 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm 40 mph 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*As ppm formaldehyde.
†Engine operated at a fuel rate midway between maximum and no load fuel rate [illegible]

TABLE E-5. EXHAUST EMISSIONS SUMMARY

Bus: [illegible]
Date: August [illegible], 1971

Test Configuration: [illegible]
Fuel: [illegible]

Conditions	Run No.	HC, ppmC	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes,* ppm
900 rpm 20 mph 1/2 load†	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200 rpm 30 mph 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1500 rpm 40 mph 1/2 load	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Idle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*As ppm formaldehyde.
†Engine operated at a fuel rate midway between maximum and no load fuel rate [illegible]

TABLE E-6. EXHAUST EMISSIONS SUMMARY

Bus: 704
Date: August 6, 1971

Test Configuration: LSN Injectors, Stock Muffler
Fuel: EM-139-F (No. 2 Diesel, Chicago Area)

Conditions	Run No.	HC, ppm C	CO, ppm	NO, ppm	Acrolein, ppm	Formaldehyde, ppm	Aliphatic Aldehydes*, ppm
900 rpm	4.	275	139	885	0.9	2.0	13.4
24 mph	8.	275	114	856	1.3	2.7	11.6
1/2 load†	12.	275	165	914	1.3	2.0	11.6
	14.	275	152	885	1.2	1.4	9.8
		275	143	885	1.2	2.0	11.6
1200 rpm	3.	237	63	827	0.4	2.0	9.8
32 mph	7.	250	101	885	0.6	2.7	11.6
1/2 load	11.	250	114	856	0.5	1.4	9.8
	15.	250	114	827	0.6	1.4	11.6
		247	98	849	0.5	1.9	10.7
1500 rpm	2.	200	50	690	0.5	2.0	16.2
40 mph	5.	212	53	771	0.6	2.0	11.6
1/2 load	10.	237	88	771	0.5	2.0	13.4
	16.	212	88	771	0.6	2.7	11.6
		215	70	751	0.6	2.2	13.0
Idle	1.	262	203	207	0.6	6.7	20.4
	6.	275	203	239	0.4	4.1	20.5
	9.	288	239	218	0.5	7.4	18.6
	13.	288	229	229	0.5	3.4	19.7
		278	218	223	0.5	5.4	19.8

*As ppm formaldehyde.
†Engine operated at a fuel rate midway between maximum and no load fuel rate except at idle.

TABLE E-7. 13-MODE CYCLE EMISSIONS - EFFECT OF FUEL
Bus 704

Date: August 3, 1971 Fuel: EM-165-F (No. 1 Diesel)

RUN 1

MODE	$C_1H_{1.85}$, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr $C_1H_{1.85}$ (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	238	216	138	Idle	—	12.96	.05	13.01	2.74	4.95	3.36	—
2	250	229	166	1000	—	20.38	.14	20.52	5.42	9.89	7.68	—
3	238	114	337	"	22	20.41	.20	20.61	5.18	4.94	15.67	1.76
4	250	76	561	"	51	20.41	.35	20.76	5.48	3.32	26.27	4.08
5	300	114	899	"	74	20.41	.48	20.89	6.61	5.01	42.35	5.92
6	330	3370	944	"	102	20.38	.68	21.06	7.34	149.33	44.85	8.16
7	250	190	147	Idle	—	12.96	.06	13.02	2.87	4.36	3.61	—
8	363	359	974	1600	142	33.77	.93	34.70	13.31	26.21	76.25	11.36
9	262	50	677	"	101	33.77	.67	34.44	9.53	3.62	52.60	8.08
10	238	50	440	"	67	33.77	.49	34.26	8.61	3.60	34.01	5.36
11	225	76	292	"	36	33.66	.34	34.00	8.08	5.44	22.40	2.88
12	238	63	303	"	—	33.66	.36	34.02	8.55	4.51	23.24	—
13	265	178	176	Idle	—	12.92	.05	12.97	3.01	4.07	4.21	—
								TOTALS	86.72	229.25	357.82	47.60

RUN 2

MODE	$C_1H_{1.85}$, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr $C_1H_{1.85}$ (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	250	229	166	Idle	—	12.96	.05	13.01	2.86	5.23	4.08	—
2	262	229	176	1000	—	20.41	.14	20.55	5.67	9.92	8.17	—
3	225	139	359	"	25	20.38	.22	20.60	4.89	6.02	16.68	2.00
4	275	89	590	"	50	20.38	.34	20.72	6.02	3.88	27.57	4.00
5	313	139	914	"	71	20.38	.47	20.85	6.89	6.10	42.94	5.68
6	362	3841	944	"	98	20.36	.67	21.03	8.04	169.95	44.79	7.84
7	262	203	239	Idle	—	12.88	.06	12.94	3.00	4.63	5.84	—
8	312	412	1004	1600	142	33.76	.93	34.69	11.43	30.07	78.57	11.36
9	250	63	703	"	101	33.76	.67	34.43	9.07	4.56	54.60	8.08
10	250	63	452	"	70	33.76	.57	34.33	9.05	4.54	34.95	5.60
11	238	88	282	"	34	34.04	.33	34.37	8.64	6.36	21.87	2.72
12	250	76	314	"	—	34.00	.36	34.36	9.07	5.47	24.34	—
13	276	178	197	Idle	—	12.88	.05	12.93	3.14	4.06	4.81	—
								TOTALS	87.83	260.30	367.08	47.28

g/hr $C_1H_{1.85}$ = 0.0132 (ppm $C_1H_{1.85}$)(Exh Flow, lb/min)(Weight Factor)
g/hr CO = 0.0263 (ppm CO)(Exh Flow, lb/min)(Weight Factor)
g/hr NO = 0.0282 (ppm NO)(Exh Flow, lb/min)(Weight Factor)

	RUN 1	RUN 2
BSHC, g/bhp hr	1.82	1.86
BSCO, g/bhp hr	4.82	5.52
BSNO, g/bhp hr	7.54	7.81

TABLE E-8. 13-MODE CYCLE EMISSIONS - EFFECT OF FUEL
Bus 704

Date: August 2, 1971 Fuel: EM-166-F (No. 2 Diesel - Local)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	250	177	136	Idle	—	12.38	.06	12.98	2.87	4.07	4.56	—
2	250	190	186	1000	—	20.43	.13	20.56	5.43	8.22	7.24	—
3	244	88	365	"	24	20.47	.21	20.68	4.91	3.13	15.16	1.75
4	250	80	475	"	45	20.47	.32	20.79	5.49	4.17	22.28	3.60
5	325	439	714	"	84	20.46	.57	21.03	7.22	19.42	41.30	6.72
6	287	5766	777	"	106	20.47	.77	21.24	6.44	266.61	38.29	8.48
7	250	162	207	Idle	—	12.38	.06	12.98	2.87	3.48	5.08	—
8	250	847	929	1600	152	33.96	.99	34.95	9.25	62.38	73.35	12.16
9	225	38	758	"	121	33.96	.78	34.74	8.25	2.78	59.41	9.68
10	212	12	500	"	78	33.95	.55	34.50	7.72	.87	38.92	6.24
11	212	25	282	"	34	34.04	.33	34.37	7.69	1.81	21.87	2.72
12	212	25	292	"	—	34.04	.33	34.37	7.70	1.81	22.65	—
13	237	126	207	Idle	—	12.88	.05	12.94	2.71	2.87	5.06	—
								TOTALS	78.33	380.28	355.07	57.52

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	225	165	197	Idle	—	12.92	.06	12.98	2.58	3.77	4.53	—
2	255	205	166	1000	—	20.47	.13	20.60	4.89	8.80	7.71	—
3	200	101	325	"	29	20.47	.21	20.68	4.37	4.39	15.01	2.32
4	212	63	500	"	45	20.43	.32	20.75	4.65	2.75	23.41	3.60
5	275	614	944	"	83	20.43	.55	20.98	6.09	28.89	44.68	6.64
6	237	6188	777	"	104	20.43	.72	21.15	5.29	275.36	39.12	8.32
7	237	182	217	Idle	—	12.86	.06	12.92	2.71	3.46	5.36	—
8	225	988	957	1600	153	33.93	1.00	34.93	8.30	72.61	75.57	12.24
9	200	50	771	"	117	33.96	.76	34.72	7.33	3.65	60.39	9.36
10	200	25	500	"	78	33.96	.55	34.51	7.29	1.82	38.93	6.24
11	200	50	292	"	38	34.25	.35	34.60	7.31	3.64	22.77	3.04
12	200	50	303	"	—	34.51	.36	34.87	7.30	3.64	23.63	—
13	233	139	217	Idle	—	12.92	.05	12.97	2.58	3.18	5.32	—
								TOTALS	70.69	418.39	365.67	57.76

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0158(ppm C_6H_{14})(exh. flow, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.36	1.37
g/hr CO = 0.0263(ppm CO)(exh. flow, lb/min)(Weight Factor)	BSCO, g/bhp hr	7.38	8.04
g/hr NO = 0.0782(ppm NO)(exh. flow, lb/min)(Weight Factor)	BSNO, g/bhp hr	6.87	7.07

TABLE E-9. 13-MODE CYCLE EMISSIONS - EFFECT OF FUEL
Bus 704

Date: August 5, 1971 Fuel: EM-139-F (No. 2 Diesel - Chicago)

RUN 1

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	238	227	156	Idle	—	12.88	.04	12.92	2.72	5.21	3.81	—
2	238	216	166	1000	—	20.30	.14	20.44	5.14	9.29	7.65	—
3	225	126	348	"	27	20.35	.23	20.58	4.89	5.46	16.16	2.16
4	225	88	561	"	51	20.35	.35	20.70	4.91	3.83	26.20	4.08
5	288	203	927	"	77	20.35	.51	20.86	6.34	8.91	43.72	6.16
6	288	5961	885	"	104	20.34	.78	21.12	6.41	264.10	42.01	8.32
7	238	165	239	Idle	—	12.84	.06	12.90	2.72	3.75	5.83	—
8	238	805	1051	1600	154	33.76	1.01	34.77	8.74	58.39	82.44	12.32
9	200	38	703	"	104	33.74	.67	34.41	7.27	2.75	54.59	8.32
10	188	38	536	"	76	33.74	.54	34.28	6.81	2.74	41.41	6.08
11	188	50	326	"	39	34.06	.36	34.42	6.83	3.67	25.31	3.12
12	200	63	337	"	—	34.00	.35	34.35	7.25	4.55	26.17	—
13	238	178	197	Idle	—	12.80	.05	12.85	2.71	4.23	4.79	—
								TOTALS	72.74	377.13	380.09	50.56

RUN 2

MODE	C_6H_{14}, ppm	CO, ppm	NO, ppm	ENGINE SPEED, rpm	OBSERVED POWER, bhp	AIR FLOW, lb/min	FUEL FLOW, lb/min	EXHAUST FLOW, lb/min	g/hr C_6H_{14} (weighted)	g/hr CO (weighted)	g/hr NO (weighted)	OBSERVED bhp (weighted)
1	238	227	166	Idle	—	12.72	.04	12.76	2.73	5.23	4.06	—
2	225	229	186	1000	—	20.35	.14	20.49	4.87	9.87	8.60	—
3	225	126	373	"	27	20.35	.23	20.58	4.89	5.46	18.25	2.16
4	238	77	664	"	54	20.32	.37	20.69	5.20	3.35	30.71	4.32
5	288	242	1035	"	75	20.38	.49	20.87	6.35	10.63	48.73	6.00
6	275	5966	899	"	102	20.38	.71	21.09	6.12	264.73	42.77	8.16
7	238	165	239	Idle	—	12.88	.05	12.93	2.72	3.76	5.84	—
8	238	847	1082	1600	154	33.79	1.01	34.80	8.75	62.02	84.85	12.32
9	200	38	781	"	104	33.74	.68	34.42	7.27	2.75	60.76	8.32
10	200	38	549	"	78	33.73	.55	34.28	7.24	2.74	42.46	6.24
11	188	50	337	"	37	34.04	.35	34.39	6.83	3.62	26.15	2.96
12	188	50	348	"	—	34.06	.36	34.42	6.83	3.62	27.08	—
13	238	165	197	Idle	—	12.88	.03	12.91	2.72	3.75	4.81	—
								TOTALS	72.52	381.53	405.47	50.48

		RUN 1	RUN 2
g/hr C_6H_{14} = 0.0132(ppm C_6H_{14})(EXH. FLOW, lb/min)(Weight Factor)	BSHC, g/bhp hr	1.44	1.44
g/hr CO = 0.0263(ppm CO)(EXH. FLOW, lb/min)(Weight Factor)	BSCO, g/bhp hr	7.46	7.56
g/hr NO = 0.0282(ppm NO)(EXH. FLOW, lb/min)(Weight Factor)	BSNO, g/bhp hr	7.52	8.03

TABLE E-18. GASEOUS EMISSION RATES FOR THREE FUELS – BUS 704

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE E-11. FEDERAL SMOKE TEST RESULTS - BUS 704

Date: August 3, 1971

Fuel: EM-165-F (No. 1 Diesel)

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	22.5	1	6.4	1	8.9
2	13.5	2	4.8	2	6.0
3	7.4	3	3.8	3	3.4
4	3.4	4	3.8	4	3.5
5	4.0	5	3.4	5	3.1
6	3.9	6	3.3	6	4.0
7	3.1	7	3.3	7	3.8
8	4.1	8	3.3	8	3.8
9	3.9	9	3.5	9	2.7
10	4.8	10	2.1	10	4.0
11	3.0	11	2.9	11	4.0
12	3.2	12	2.8	12	3.6
13	3.8	13	2.1	13	3.3
14	3.5	14	2.6	14	3.1
15	3.0	15	2.6	15	3.0

Total Smoke % 88.3 45.8 55.8

Factor (a) = $\frac{189.9}{45}$ = 4.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.5	1	3.0	1	3.0
2	2.5	2	3.0	2	3.1
3	2.5	3	2.9	3	3.2
4	2.5	4	2.9	4	3.0
5	2.5	5	3.0	5	3.1

Total Smoke % 13.5 14.8 15.4

Factor (b) = $\frac{43.7}{15}$ = 2.9 %

Comments:

No. 1 diesel fuel

[illegible]

TABLE E-12. FEDERAL SMOKE TEST RESULTS - BUS 704

Date: August 3, 1971 Fuel: EM-165-F (No. 1 Diesel)

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.6	1	4.1	1	5.0
2	4.4	2	3.8	2	3.4
3	3.6	3	4.4	3	4.4
4	3.8	4	3.6	4	4.0
5	3.8	5	3.4	5	3.8
6	3.8	6	3.8	6	3.7
7	3.4	7	3.3	7	4.8
8	4.4	8	3.2	8	4.1
9	4.2	9	3.4	9	4.8
10	4.1	10	4.3	10	4.9
11	3.9	11	4.3	11	4.8
12	4.0	12	4.6	12	4.6
13	3.2	13	4.4	13	4.4
14	3.6	14	4.7	14	4.0
15	3.0	15	3.8	15	3.7

Total Smoke % 58.2 60.3 66.2

Factor (a) = 184.7/45 = 4.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.8	1	3.7	1	3.8
2	3.7	2	3.8	2	4.0
3	3.7	3	3.3	3	4.0
4	3.8	4	3.7	4	4.0
5	3.8	5	4.0	5	4.2

Total Smoke % 18.0 18.3 20.0

Factor (b) = 57.3/15 = 3.9 %

Comments:

LSN Injectors - Stock Muffler

No. 1 diesel fuel

TABLE E-13. FEDERAL SMOKE TEST RESULTS - BUS 704

Date: August 2, 1971

Fuel: EM-166-F (No. 2 Diesel - Local)

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 83.3 101.9 80.9

Factor (a) = 266.1 / 45 = 5.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	5.0	1	4.2	1	[illegible]
2	5.0	2	4.2	2	[illegible]
3	5.0	3	4.2	3	5.0
4	5.0	4	4.3	4	5.1
5	5.0	5	4.4	5	5.1

Total Smoke % 25.0 21.3 25.1

Factor (b) = 71.4 / 15 = 4.8 %

Comments:

[illegible] operation - Stock Muffler

No. 2 Diesel fuel

TABLE E-14. FEDERAL SMOKE TEST RESULTS - BUS 704

Date: August 5, 1971 Fuel: EM-166-F (No. 2 Diesel - Level)

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	8.0	1	8.5	1	11.1
2	[illegible]	2	6.5	2	8.0
3	[illegible]	3	5.5	3	[illegible]
4	[illegible]	4	5.0	4	5.7
5	[illegible]	5	[illegible]	5	5.7
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	5.5	8	7.1	8	6.7
9	7.5	9	7.0	9	[illegible]
10	8.6	10	6.5	10	7.0
11	6.7	11	6.0	11	6.6
12	6.6	12	5.6	12	6.1
13	5.8	13	5.0	13	5.6
14	5.0	14	6.7	14	5.1
15	5.0	15	6.7	15	6.7

Total Smoke % 96.8 88.5 95.9

Factor (a) = 282.2 / 45 = 6.3 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	5.5	1	5.0	1	[illegible]
2	5.5	2	5.1	2	[illegible]
3	5.6	3	5.3	3	5.6
4	5.8	4	5.7	4	5.6
5	6.1	5	[illegible]	5	[illegible]

Total Smoke % 28.3 26.7 27.2

Factor (b) = 82.2 / 15 = 5.5 %

Comments:

[illegible]

No. 2 diesel fuel

TABLE E-15. FEDERAL SMOKE TEST RESULTS - BUS 763

Date: August 5, 1971 Fuel: EM-139-F (No. 2 Diesel-Chicago)

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 48.2 46.5 46.0

Factor (a) = $\frac{140.7}{45}$ = 3.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 13.6 15.9 15.4

Factor (b) = $\frac{44.9}{15}$ = 2.9 %

Comments:

LSN Injectors Stack Muffler

No. 2 Fuel (Chicago)

TABLE E-16. FEDERAL SMOKE TEST RESULTS - BUS 704

Date: August 5, 1971

Fuel: EM-139-F (No. 2 Diesel- Chicago)

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.4	1	5.0	1	6.0
2	3.2	2	4.4	2	5.2
3	3.0	3	4.2	3	5.1
4	3.7	4	4.0	4	5.0
5	3.6	5	3.7	5	4.7
6	3.1	6	3.4	6	4.1
7	3.1	7	3.4	7	3.8
8	3.0	8	3.1	8	3.8
9	3.6	9	3.0	9	3.3
10	3.1	10	3.3	10	3.4
11	3.0	11	3.3	11	3.1
12	3.0	12	3.1	12	3.0
13	3.6	13	3.1	13	3.6
14	3.0	14	3.1	14	3.2
15	2.7	15	3.3	15	1.0

Total Smoke % 48.1 53.4 55.8

Factor (a) = $\frac{157.3}{45}$ = 3.5 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.8	1	3.5	1	3.7
2	3.0	2	3.6	2	3.7
3	3.4	3	3.8	3	3.7
4	3.1	4	3.6	4	3.4
5	3.2	5	3.8	5	3.5

Total Smoke % 16.5 18.3 18.0

Factor (b) = $\frac{52.8}{15}$ = 3.5 %

Comments:

L5N Injectors - Stock Muffler

No. 2 Fuel (Chicago)

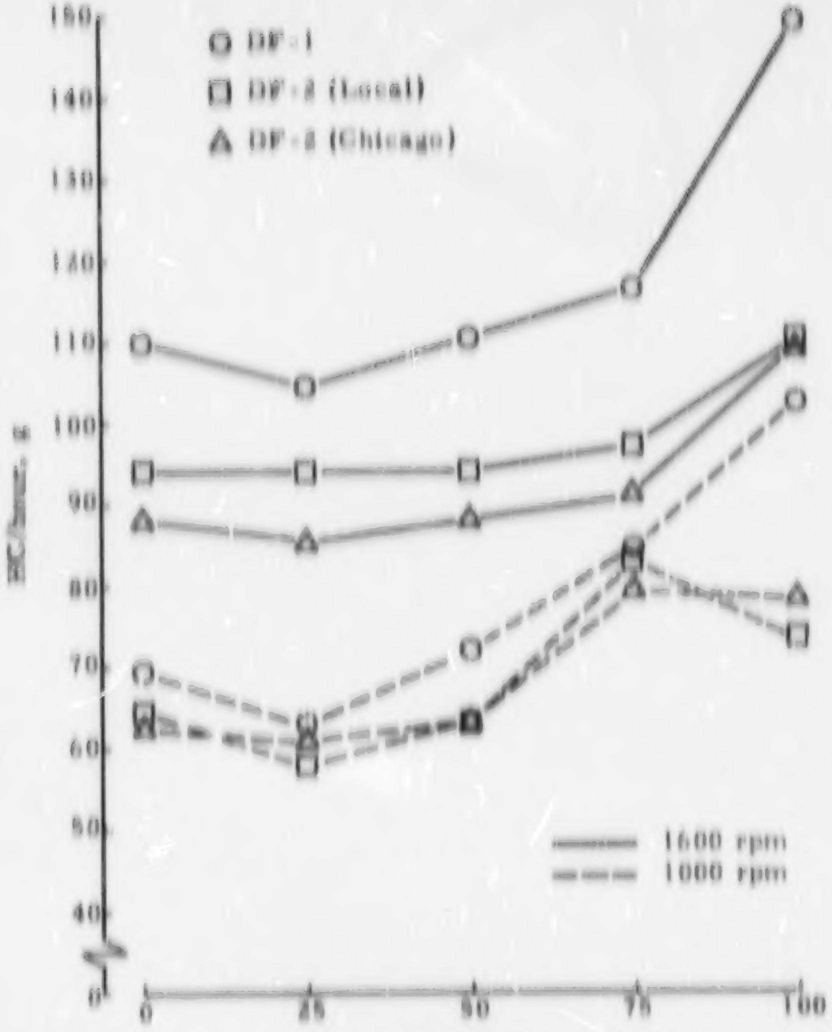

FIGURE E-1. AVERAGE GRAMS OF HC PER HOUR FOR A 6V-71E ENGINE OPERATED ON THREE DIESEL FUELS

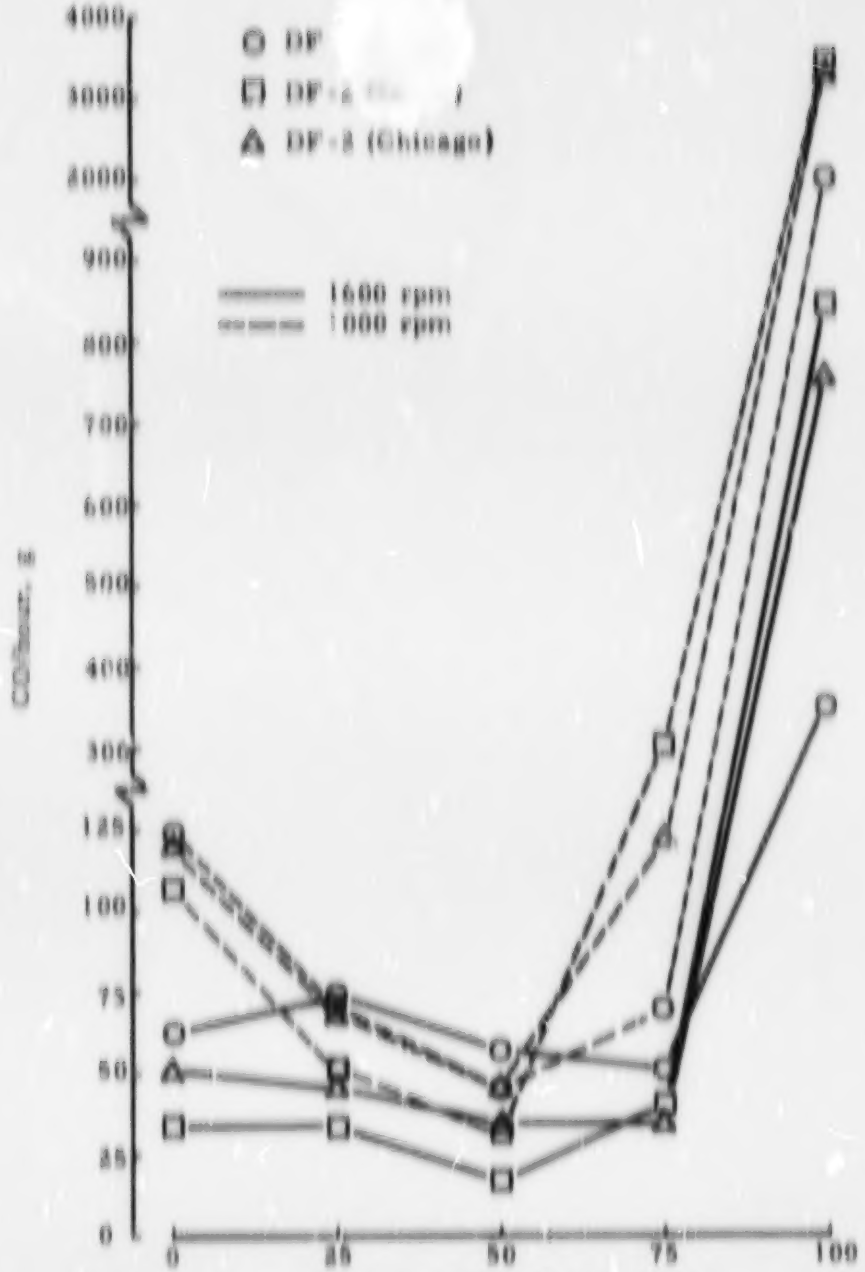

FIGURE E-2. AVERAGE GRAMS OF CO PER HOUR FOR A 6V-71E ENGINE OPERATED ON THREE DIESEL FUELS

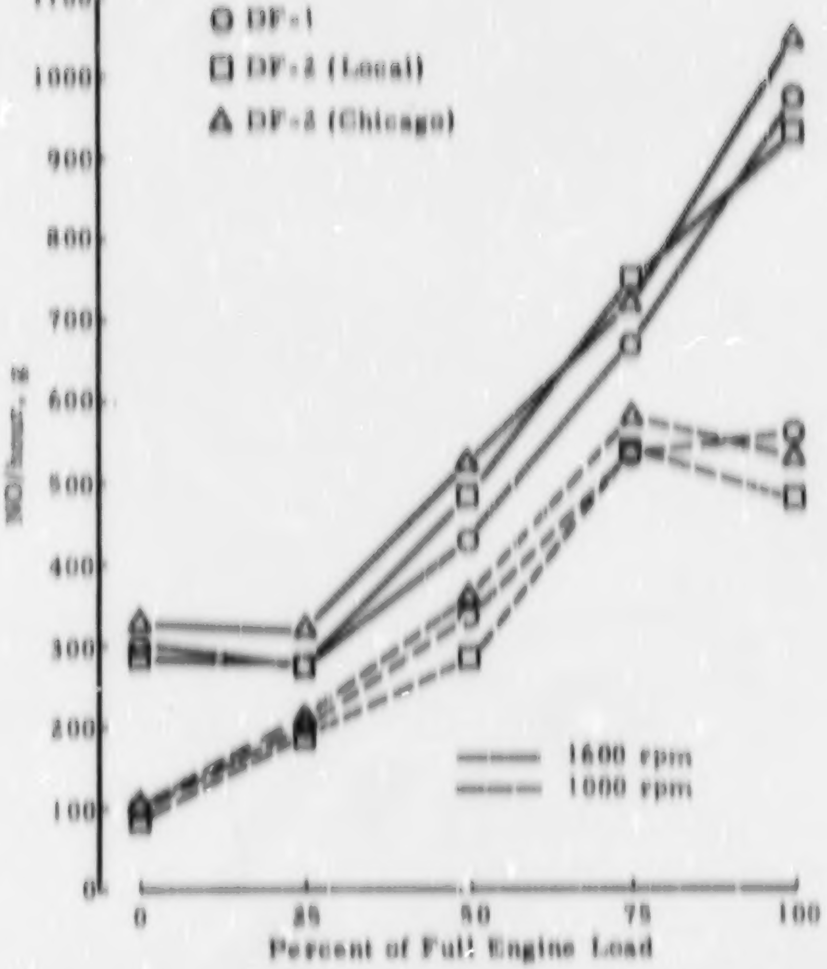

FIGURE E-3. AVERAGE GRAMS OF NO PER HOUR FOR A 6V-71E ENGINE OPERATED ON THREE DIESEL FUELS

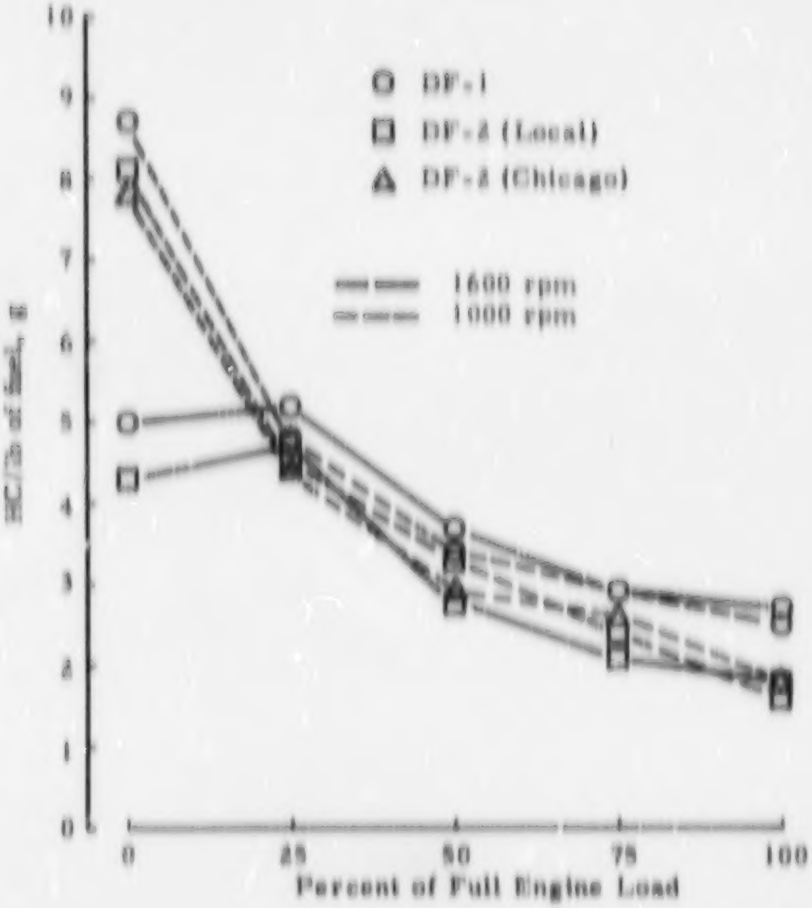

FIGURE E-4. AVERAGE GRAMS OF HC PER LB OF FUEL FOR A 6V-71E ENGINE OPERATED ON THREE DIESEL FUELS

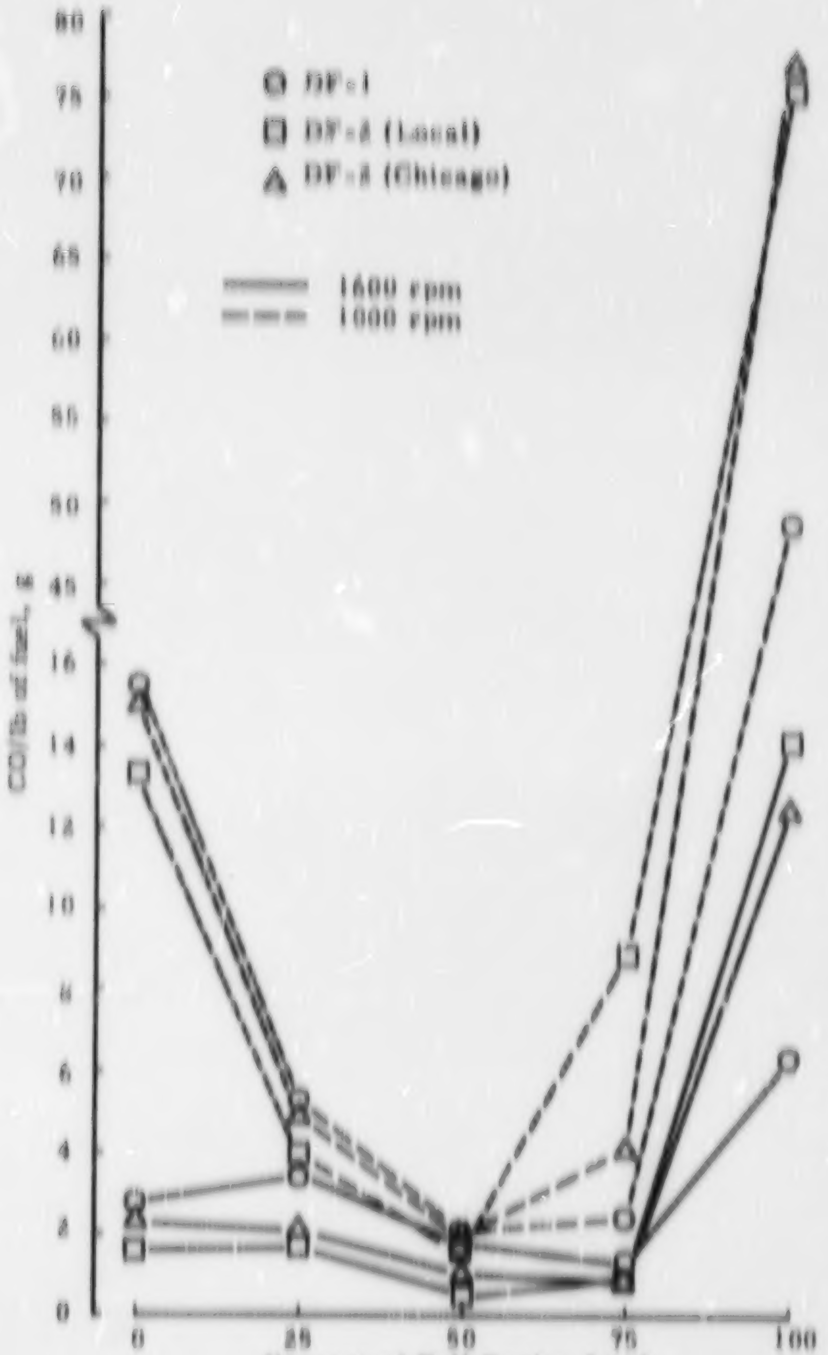

FIGURE E-5. AVERAGE GRAMS OF CO PER LB OF FUEL FOR A 6V-71E ENGINE OPERATED ON THREE DIESEL FUELS

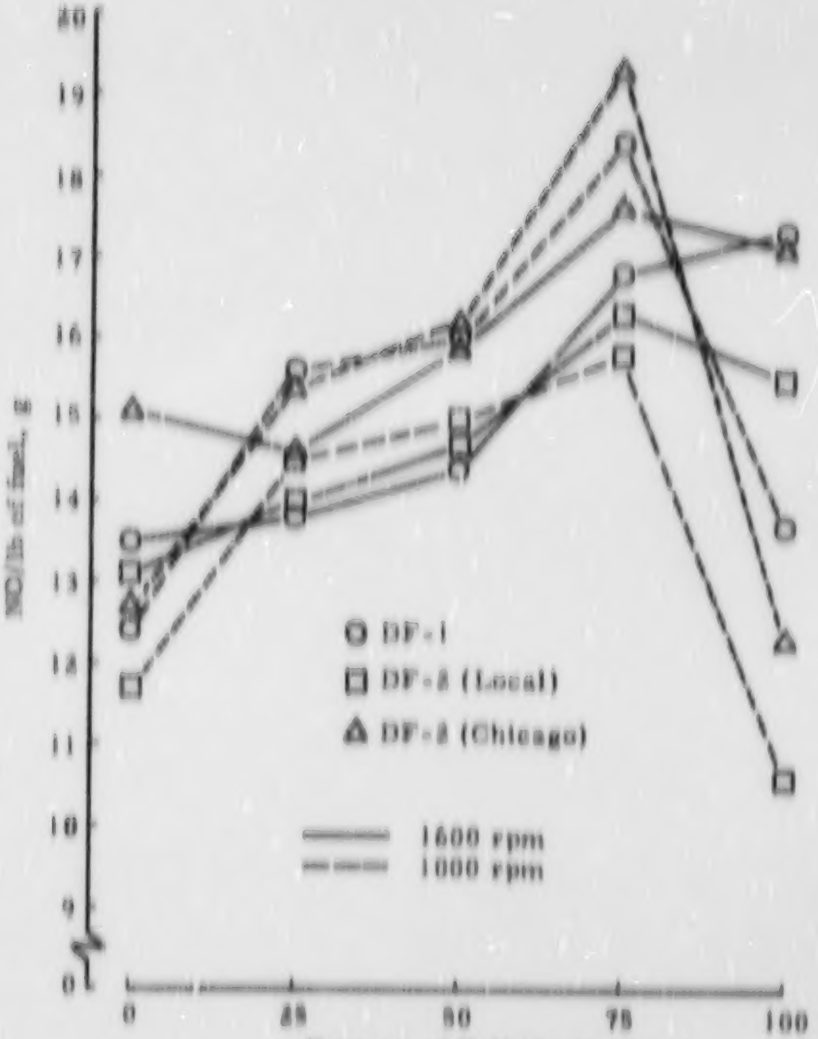

FIGURE E-6. AVERAGE GRAMS OF NO PER LB OF FUEL FOR A 6V-71E ENGINE OPERATED ON THREE DIESEL FUELS

APPENDIX F

FEDERAL SMOKE TEST

TABULAR DATA

TABLE F-1. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 702
Date: 9/24/70

Test Miles: 1,758
Test Hours: 142

Test Configuration: LSN + Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 12.8 11.7 16.1

Factor (a) = $\frac{40.6}{45}$ = 0.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	1.0	1	1.0	1	1.1
2	1.0	2	1.0	2	1.1
3	1.0	3	1.0	3	1.1
4	1.0	4	1.0	4	1.1
5	1.0	5	1.0	5	1.1

Total Smoke % 5.0 5.0 5.5

Factor (b) = $\frac{15.5}{15}$ = 1.0 %

Comments:

1.0	1.0	1.1
1.0	1.0	1.1
1.0	1.0	1.1
3.0	3.0	3.3

$\frac{9.3}{9}$

"c" factor = 1.0 %

TABLE F-2. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 702 Test Miles: 1,758 Test Configuration: LSN + Stock Muffler
Date: 9/29/70 Test Hours: 142 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] / 45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = [illegible] %

Comments:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

"c" factor = 1.8%

TABLE F-3. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Initial Inspection

Bus: 702	Test Miles: 1,758	Test Configuration: 608 + Stock Muffler
Date: 10/1/70	Test Hours: 143	Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
16	[illegible]	16	[illegible]	16	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible]/45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible]/15 = 1.7 %

Comments: [illegible]

"a" factor = 1.8 %

TABLE F-4. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 704
Date: 9/10/79

Test Miles: 1,073
Test Hours: 98

Test Configuration: LSN + Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] / 45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 7.6 8.0 [illegible]

Factor (b) = 24.1 / 15 = 1.6 %

Comments: [illegible] [illegible] [illegible]

[illegible]

"c" factor = 2.3 %

TABLE F-5. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 704 Test Miles: 1,073 Test Configuration: LSN + Stock Muffler
Date: 9/15/76 Test Hours: 98 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.0	1	2.6	1	2.8
2	2.1	2	2.7	2	2.2
3	2.2	3	2.8	3	2.2
4	2.4	4	2.4	4	2.2
5	2.3	5	2.5	5	2.2
6	2.2	6	2.6	6	2.2
7	2.1	7	2.6	7	1.8
8	2.3	8	2.7	8	2.1
9	1.8	9	1.7	9	1.8
11	2.2	10	2.0	10	1.9
12	2.1	11	2.1	11	1.6
13	2.1	12	2.1	12	1.5
14	2.0	13	2.0	13	1.5
15	2.1	14	2.1	14	1.4
16	2.2	15	2.0	15	1.4

Total Smoke % 33.6 36.2 30.1

Factor (a) = $\frac{99.9}{45}$ = 2.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.3	1	2.0	1	1.2
2	2.2	2	1.8	2	1.2
3	2.2	3	1.8	3	1.3
4	2.2	4	1.7	4	1.3
5	2.4	5	2.0	5	1.6

Total Smoke % 11.2 9.7 6.8

Factor (b) = $\frac{27.7}{15}$ = 1.8 %

Comments:

3.0	5.2	4.8
2.2	3.7	3.5
2.3	2.2	2.2
[illegible]	11.0	10.5

"D" factor = 2.2 %

TABLE F-6. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 704 Test Miles: 1,073 Test Configuration: 608 + Stock Muffler
Date: 9/17/70 Test Hours: 98 Fuel: EM-165-F (No. 1 Diesel

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
2	[illegible]	1	[illegible]	1	[illegible]
3	[illegible]	2	[illegible]	2	[illegible]
4	[illegible]	3	[illegible]	3	[illegible]
5	[illegible]	4	[illegible]	[illegible]	[illegible]
6	[illegible]	5	[illegible]	[illegible]	[illegible]
7	[illegible]	6	[illegible]	[illegible]	[illegible]
8	[illegible]	7	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	11	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	15	[illegible]	[illegible]	[illegible]
16	[illegible]	16	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = 274.6 / 45 = 6.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.1	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % 38.3 47.0 42.8

Factor (b) = 129.1 / 15 = 8.6 %

Comments: [illegible]

'C' factor = 8.3 %

TABLE F-7. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 707
Date: 8/27/78

Test Miles: 911
Test Hours: 99

Test Configuration: LSN + Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 21.8 18.8 22.6

Factor (a) = [illegible] / 45 = 1.4 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 7.6 6.0 8.5

Factor (b) = [illegible] / 15 = 1.4 %

Comments:

1.5 1.6 1.0
1.5 1.3 1.0
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]

[illegible] = 1.5 "c" factor = 1.5 %

TABLE F-5. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Initial Inspection

Bus: 707
Date: 9/1/76

Test Miles: 911
Test Hours: 99

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.0	1	2.1	1	1.8
2	2.1	2	2.1	2	2.0
3	2.0	3	2.0	3	1.7
4	2.0	4	2.1	4	1.6
5	2.0	5	2.0	5	1.2
6	1.9	6	1.8	6	1.8
7	1.9	7	1.7	7	1.7
8	1.8	8	1.7	8	1.7
9	1.8	9	1.8	9	2.0
10	1.8	10	2.0	10	1.8
11	2.0	11	1.2	11	2.0
12	1.7	12	1.7	12	2.2
13	1.8	13	1.8	13	2.1
14	1.8	14	1.8	14	1.8
15	2.3	15	1.3	15	2.0

Total Smoke % 28.8 28.3 27.8

Factor (a) = 84.9/45 = 1.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.0	1	2.0	1	1.9
2	2.0	2	1.9	2	1.9
3	2.0	3	1.9	3	1.9
4	2.0	4	2.1	4	1.9
5	2.0	5	1.9	5	1.9

Total Smoke % 10.0 9.8 9.5

Factor (b) = 29.3/15 = 1.9 %

Comments:

2.3	2.1	2.2
2.1	2.1	2.1
2.0	2.1	2.0
6.4	6.3	6.3

6.4/3 = 2.1 "c" factor = 2.1 %

TABLE F-9. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Initial Inspection

Bus: 707
Date: 9/3/76

Test Miles: 911
Test Hours: 99

Test Configuration: 60S + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 42.7 43.3 45.3

Factor (a) = 131.3 / 45 = 2.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 16.5 14.3 17.3

Factor (b) = 48.1 / 15 = 3.2 %

Comments: [illegible] [illegible] [illegible]

11.9 10.9 11.6

34.4

"c" factor: 3.8 %

TABLE F-10. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

First Interim Inspection

Bus: 702 Test Miles: 22,962 Test Configuration: LSN + Catalytic Muffler

Date: 4/26/71 Test Hours: 1,721 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible]/45 = 2.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % 19.9 [illegible] [illegible]

Factor (b) = 71.2/15 = 4.7 %

Comments: [illegible]

[illegible]

TABLE F-11. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 702
Date: 4/26/71

Test Miles: 22,962
Test Hours: 1,721

Test Configuration: LSN + Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 20.3 | 24.8 | 25.1

Factor (a) = 70.2 / 45 = 1.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 16.1 | 13.8 | 11.4

Factor (b) = 40.7 / 15 = 2.7 %

Comments: [illegible]

24.8

'c' factor = 2.8%

TABLE F-12. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 702 Test Miles: 22,962 Test Configuration: LSN + Stock Muffler
Date: 4/28/71 Test Hours: 1,721 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	1.8	1	2.1	1	1.7
2	1.8	2	1.8	2	1.8
3	1.7	3	1.7	3	1.9
4	2.0	4	1.7	4	2.1
5	2.0	5	2.0	5	2.1
6	2.1	6	2.0	6	2.1
7	2.1	7	2.0	7	2.1
8	2.1	8	2.0	8	2.0
9	2.1	9	2.0	9	2.0
10	2.3	10	1.8	10	1.9
11	2.6	11	1.8	11	2.0
12	2.8	12	1.7	12	2.0
13	2.5	13	1.7	13	2.1
14	2.5	14	2.0	14	2.0
15	2.3	15	2.0	15	2.1
Total Smoke %	33.0		29.8		31.7

Factor (a) = 94.5/45 = 2.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.6	1	2.1	1	2.8
2	2.6	2	2.1	2	2.8
3	2.1	3	2.1	3	2.6
4	2.1	4	2.1	4	2.2
5	2.2	5	2.2	5	2.2
Total Smoke %	11.6		10.6		12.6

Factor (b) = 34.8/15 = 2.3 %

Comments:

2.8	2.5	2.7
2.4	2.1	2.6
2.4	2.1	2.4
7.6	6.7	7.7

22.0/9

"a" factor: 2.5 %

TABLE F-15. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 702 Test Miles: 53,962 Test Configuration: LSN + Stock Muffler
Date: 4/28/71 Test Hours: 1,721 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 22.6 21.5 22.5

Factor (a) = 66.6 / 45 = 1.5 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	1.8	1	2.0	1	2.2
2	1.8	2	2.1	2	2.2
3	2.0	3	2.1	3	2.1
4	2.1	4	2.1	4	2.1
5	2.1	5	2.2	5	2.1

Total Smoke % 9.9 10.5 11.5

Factor (b) = 31.9 / 15 = 2.1 %

Comments:

2.1	2.2	2.1
2.1	2.1	2.0
2.2	2.1	2.2
2.2	2.4	1.1

2.4

"C" factor = 2.4 %

TABLE F-14. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 702	Test Miles: 22,962	Test Configuration: 608 + Stock Muffler
Date: 4/29/71	Test Hours: 1,721	Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.5	1	2.2	1	2.8
2	4.0	2	2.7	2	3.3
3	3.4	3	2.6	3	2.2
4	4.7	4	2.6	4	2.6
5	4.6	5	2.6	5	2.6
6	3.4	6	2.1	6	2.7
7	4.5	7	2.3	7	2.0
8	3.8	8	2.1	8	2.0
9	3.6	9	2.1	9	2.6
10	3.6	10	2.0	10	2.6
11	3.7	11	2.0	11	2.6
12	3.4	12	2.1	12	2.6
13	4.0	13	2.1	13	2.6
14	3.7	14	2.3	14	2.6
15	3.8	15	2.2	15	2.6

Total Smoke % 68.5 34.6 38.6

Factor (a) = 141.7/45 = 3.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.2	1	2.1	1	3.5
2	2.4	2	2.0	2	3.5
3	2.2	3	2.1	3	3.5
4	2.3	4	2.1	4	3.3
5	2.6	5	2.2	5	2.8

Total Smoke % 12.0 10.5 16.6

Factor (b) = 39.1/15 = 2.6 %

Comments:

4.5	2.4	3.5
2.0	2.7	3.4
4.4	4.4	4.4
10.9	9.5	10.3

281

'c' factor = 6.3 %

TABLE F-15. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 702
Date: 4/29/71
Test Miles: 22,962
Test Hours: 1,721
Test Configuration: 608 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.6	1	2.8	1	2.4
2	3.4	2	2.2	2	2.0
3	3.6	3	2.6	3	2.7
4	2.2	4	2.6	4	2.3
5	2.1	5	2.7	5	2.4
6	3.0	6	2.7	6	2.1
7	2.9	7	2.7	7	2.7
8	2.9	8	2.7	8	2.9
9	2.9	9	2.4	9	1.9
10	3.0	10	2.4	10	1.9
11	2.9	11	2.2	11	1.9
12	2.7	12	2.2	12	1.9
13	2.4	13	2.4	13	1.9
14	2.3	14	2.9	14	1.9
15	2.3	15	2.7	15	1.8

Total Smoke % 44.6 39.9 32.7

Factor (a) = 117.2/45 = 2.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.3	1	2.0	1	2.2
2	4.6	2	2.1	2	2.3
3	4.4	3	2.1	3	2.1
4	4.1	4	2.2	4	2.2
5	4.4	5	2.3	5	2.2

Total Smoke % 21.8 10.7 11.0

Factor (b) = 44.5/15 = 3.0 %

Comments:

4.8	2.2	2.6
4.5	2.2	2.2
4.6	2.2	2.2
4.1	2.2	2.2

24.7

'c' factor = 4.0%

TABLE F-16. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 704　Test Miles: 25,193　Test Configuration: LSN + Catalytic Muffler
Date: 4/12/71　Test Hours: 2,063　Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.5	1	4.5	1	4.8
2	4.4	2	3.0	2	4.5
3	4.6	3	4.0	3	4.0
4	6.1	4	3.7	4	3.7
5	4.3	5	3.7	5	3.6
6	4.4	6	3.8	6	3.4
7	3.9	7	4.4	7	3.7
8	3.4	8	3.4	8	4.0
9	3.4	9	4.7	9	4.3
10	4.7	10	5.3	10	3.7
11	4.6	11	3.7	11	3.6
12	4.1	12	2.6	12	3.3
13	3.4	13	3.2	13	3.1
14	3.3	14	6.0	14	3.0
15	3.0	15	6.0	15	3.0

Total Smoke % 71.4　65.2　55.3

Factor (a) = 192.6 / 45 = 4.3 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.7	1	4.8	1	4.3
2	4.7	2	3.7	2	4.1
3	4.6	3	4.0	3	4.1
4	4.9	4	4.1	4	4.0
5	4.7	5	4.0	5	4.0

Total Smoke % 23.4　20.2　20.5

Factor (b) = 63.9 / 15 = 4.3 %

Comments:

4.3	4.3	4.5
6.6	6.6	4.5
4.1	4.2	4.4
21.0	17.2	13.8

54.2

'c' factor = 3.7%

TABLE F-17. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 704 Test Miles: 35,193 Test Configuration: LSN + Stock Muffler
Date: 4/14/71 Test Hours: 2,063 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.5	1	5.0	1	6.0
2	2.0	2	4.1	2	7.0
3	3.1	3	3.1	3	6.1
4	4.4	4	3.0	4	6.0
5	4.1	5	3.0	5	3.1
6	2.6	6	2.1	6	3.7
7	4.8	7	4.1	7	3.5
8	2.3	8	4.1	8	4.3
9	3.3	9	4.1	9	4.8
10	3.5	10	3.5	10	4.6
11	3.5	11	3.0	11	2.5
12	3.4	12	4.8	12	[illegible]
13	3.6	13	4.6	13	[illegible]
14	2.8	14	4.2	14	[illegible]
15	2.6	15	2.2	15	[illegible]

Total Smoke % 46.8 51.2 66.0

Factor (a) = 164.0/45 = 3.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.5	1	2.1	1	3.6
2	3.8	2	3.0	2	3.2
3	3.6	3	3.0	3	3.1
4	3.5	4	4.0	4	3.1
5	3.7	5	4.0	5	3.1

Total Smoke % 18.1 18.1 16.0

Factor (b) = 52.2/15 = 3.5 %

Comments: 5.0 5.0 6.0
3.5 8.3 5.6
4.4 [illegible] [illegible]
12.9 17.2 17.6

[illegible]

"c" factor = 5.3 %

TABLE F-15. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 704 Test Miles: 25,173 Test Configuration: LSN + Stock Muffler
Date: 4/14/71 Test Hours: 2,063 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.0	1	6.4	1	6.0
2	6.0	2	6.3	2	5.5
3	[illegible]	3	3.5	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	3.0	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 46.3 53.4 45.6

Factor (a) = 145.3/45 = 3.3 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 12.1 16.8 17.0

Factor (b) = 45.9/15 = 3.1 %

Comments: 6.0 6.0 [illegible] 17.2 6.4 6.3 [illegible] 18.7 6.0 5.5 [illegible] 16.5

45.9

"C" factor = 2.8 %

TABLE F-19. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 704 Test Miles: 25, 193 Test Configuration: 60S + Stock Muffler
Date: 4/15/71 Test Hours: 2,063 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	5.5	1	5.8	1	4.9
2	6.6	2	4.0	2	4.8
3	5.1	3	4.5	3	5.0
4	5.0	4	6.4	4	4.8
5	5.1	5	3.7	5	[illegible]
6	5.0	6	4.4	6	[illegible]
7	5.5	7	4.3	7	[illegible]
8	5.0	8	4.0	8	[illegible]
9	5.0	9	4.0	9	[illegible]
10	5.5	10	3.7	10	[illegible]
11	5.5	11	3.3	11	[illegible]
12	5.0	12	3.4	12	[illegible]
13	4.4	13	3.4	13	[illegible]
14	4.3	14	3.4	14	[illegible]
15	4.0	15	3.4	15	[illegible]

Total Smoke % 76.7 62.8 66.0

Factor (a) = $\frac{205.5}{45}$ = 4.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.3	1	[illegible]	1	4.3
2	4.8	2	[illegible]	2	4.9
3	4.6	3	[illegible]	3	4.1
4	4.7	4	[illegible]	4	4.6
5	4.6	5	[illegible]	5	4.1

Total Smoke % 22.4 22.7 33.3

Factor (b) = $\frac{78.4}{15}$ = 5.2 %

Comments:

6.6	7.7	5.8
6.6	6.6	5.5
6.5	[illegible]	[illegible]
19.7	19.1	16.6

54.1

"c" factor = 6.0 %

TABLE F-20. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 704 Test Miles: 28,193 Test Configuration: 608 + Stock Muffler
Date: 4/15/71 Test Hours: 2,063 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 72.2 75.6 68.5

Factor (a) = 216.3 / 45 = 4.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 26.3 21.9 24.4

Factor (b) = 72.6 / 15 = 4.8 %

Comments:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
17.7	16.0	15.8

[illegible] / 3

"A" factor = [illegible] %

TABLE F-21. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 707 Test Miles: 26,650 Test Configuration: LSN + Catalytic Muffler
Date: 3/29/71 Test Hours: 1,971 Fuel: EM-161-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible]/45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible]/15 = [illegible] %

Comments: [illegible]

"c" factor = [illegible]

TABLE F-33. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 707 Test Miles: 56,650 Test Configuration: LSN + Catalytic Muffler
Date: 3/29/71 Test Hours: 1,971 Fuel: EM-165-F (No. 1 Diesel)

Run 3

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible]/45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 16.6 [illegible] [illegible]

Factor (b) = [illegible]/15 = [illegible] %

Comments: [illegible] [illegible] [illegible]

"D" factor = [illegible] %

TABLE F-23. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

First Interim Inspection

Bus: 707
Date: 3/31/71

Test Miles: 26,650
Test Hours: 1,971

Test Configuration: LSN + Stock Muffler
Fuel: MM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.0	1	4.2	1	3.5
2	6.0	2	2.0	2	4.3
3	2.8	3	2.0	3	4.8
4	4.3	4	4.0	4	4.7
5	6.3	5	3.4	5	4.7
6	6.5	6	6.0	6	5.8
7	4.6	7	6.1	7	5.4
8	4.5	8	3.7	8	5.5
9	4.3	9	3.8	9	5.5
10	4.6	10	5.0	10	5.0
11	6.0	11	4.2	11	4.7
12	6.5	12	6.4	12	4.4
13	4.8	13	4.4	13	4.4
14	4.3	14	4.4	14	4.4
15	4.0	15	4.4	15	4.4

Total Smoke % 68.4   74.1   75.8

Factor (a) = $\frac{218.3}{45}$ = 4.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.3	1	6.5	1	5.9
2	4.4	2	6.6	2	5.9
3	4.7	3	4.8	3	5.3
4	4.1	4	6.0	4	5.7
5	5.6	5	6.1	5	4.9

Total Smoke % 23.5   30.0   27.9

Factor (b) = $\frac{81.5}{15}$ = 5.4 %

Comments:

6.0	6.1	6.3
6.3	6.1	5.8
4.8	6.0	5.8
17.1	18.2	17.9

$\frac{6.2}{3}$

3' faster 5.1 %

TABLE F-24. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 707	Test Miles: 26,650	Test Configuration: LSM + Stock Muffler
Date: 3/31/71	Test Hours: 1,971	Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.6	1	4.1	1	3.8
2	4.3	2	5.0	2	4.4
3	5.2	3	5.6	3	4.3
4	5.8	4	5.5	4	4.8
5	7.1	5	6.8	5	6.1
6	7.6	6	6.3	6	6.6
7	6.7	7	6.3	7	6.4
8	6.3	8	6.2	8	6.1
9	6.0	9	3.7	9	5.7
10	5.5	10	3.5	10	5.1
11	6.5	11	4.4	11	4.1
12	5.5	12	4.4	12	4.4
13	5.5	13	3.0	13	4.4
14	5.5	14	3.0	14	[illegible]
15	5.5	15	3.0	15	4.4

Total Smoke % 96.1 73.0 75.1

Factor (a) = 244.2/45 = 5.4 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.6	1	6.1	1	5.3
2	6.8	2	6.6	2	5.8
3	6.1	3	5.9	3	5.6
4	5.6	4	6.3	4	5.5
5	6.0	5	6.2	5	5.4

Total Smoke % 31.1 31.1 27.6

Factor (b) = 89.8/15 = 6.0 %

Comments:

7.1	6.8	6.4
7.0	6.7	6.4
7.2	7.3	6.7
21.3	20.8	20.2

62.3

"c" factor : 6.9%

TABLE F-26. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 707 Test Miles: 26,650 Test Configuration: 60S + Stock Muffler
Date: 4/2/71 Test Hours: 1,971 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.5	1	4.6	1	3.5
2	5.0	2	5.6	2	5.0
3	4.7	3	4.7	3	4.8
4	4.1	4	5.5	4	4.4
5	4.3	5	4.9	5	4.9
6	4.3	6	5.1	6	4.1
7	4.4	7	5.1	7	4.0
8	4.0	8	5.1	8	4.7
9	3.9	9	4.8	9	3.8
10	3.9	10	6.6	10	4.5
11	4.0	11	4.5	11	4.9
12	4.0	12	4.7	12	5.0
13	4.0	13	4.5	13	4.0
14	3.9	14	4.3	14	4.4
15	4.0	15	4.3	15	4.1

Total Smoke % 59.9 75.3 63.7

Factor (a) = $\frac{198.9}{45}$ = 4.4 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.9	1	4.6	1	4.1
2	4.0	2	4.8	2	4.1
3	4.1	3	4.6	3	4.4
4	4.1	4	4.5	4	4.1
5	4.0	5	4.8	5	4.3

Total Smoke % 20.1 23.3 21.0

Factor (b) = $\frac{64.4}{15}$ = 4.3 %

Comments:

4.7	5.5	5.0
4.4	4.7	4.3
4.4	4.4	4.3
13.5	14.6	13.6

43.3

"c" factor 5.1 %

TABLE F-26. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
First Interim Inspection

Bus: 707 Test Miles: 26,650 Test Configuration: 6 08 + Stock Muffler
Date: 4/5/71 Test Hours: 1, 971 Fuel: EM-165-F (No. 1 Diesel)

Run 3

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.3	1	4.5	1	4.0
2	4.1	2	4.1	2	4.6
3	3.7	3	3.8	3	4.5
4	3.5	4	3.6	4	4.3
5	4.0	5	4.0	5	3.0
6	4.2	6	4.0	6	[illegible]
7	4.0	7	4.0	7	[illegible]
8	3.9	8	4.0	8	[illegible]
9	3.7	9	3.9	9	4.7
10	3.6	10	3.8	10	4.4
11	3.5	11	3.7	11	4.3
12	3.8	12	3.6	12	4.4
13	3.3	13	3.6	13	4.2
14	3.2	14	3.6	14	4.4
15	3.2	15	3.3	15	4.3

Total Smoke % 57.8 56.6 62.3

Factor (a) = 176.7 / 45 = 3.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.9	1	4.1	1	[illegible]
2	4.0	2	4.4	2	[illegible]
3	4.0	3	4.2	3	[illegible]
4	4.0	4	4.3	4	[illegible]
5	4.0	5	[illegible]	5	[illegible]

Total Smoke % 19.9 [illegible] [illegible]

Factor (b) = 67.1 / 15 = 4.5 %

Comments: [illegible]

'c' factor = [illegible] %

TABLE F-27. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 702
Date: 8/15/71

Test Miles: 45,706
Test Hours: 3,717

Test Configuration: LSN + Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = 236.7/45 = 5.3 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible]/15 = 6.5 %

Comments: Test made with very dirty air filter element.

[illegible]

'S' factor = 6.7 %

TABLE F-28. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Second Interim Inspection

Bus: 702
Date: 8/16/71

Test Miles: 45,706
Test Hours: 5,717

Test Configuration: LSN + Catalytic Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 47.8 51.6 40.4

Factor (a) = 139.8 / 45 = 3.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 16.1 18.3 12.8

Factor (b) = 47.8 / 15 = 3.2 %

Comments: Test made with clean air filter element

"c" factor = [illegible] %

TABLE F-29. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 702
Date: 8/18/71

Test Miles: 45,706
Test Hours: 3,717

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.1	1	4.7	1	2.2
2	2.1	2	3.1	2	2.2
3	2.2	3	3.2	3	2.6
4	2.1	4	3.1	4	2.3
5	2.1	5	3.1	5	2.3
6	2.2	6	3.1	6	2.3
7	2.2	7	3.0	7	2.3
8	2.1	8	3.0	8	2.2
9	2.3	9	3.2	9	2.2
10	2.4	10	3.2	10	2.3
11	2.4	11	3.0	11	2.8
12	2.2	12	3.0	12	2.8
13	2.1	13	3.3	13	2.5
14	2.1	14	3.0	14	2.4
15	2.2	15	3.7	15	2.2

Total Smoke % 34.0 48.6 37.8

Factor (a) = 120.4 / 45 = 2.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.7	1	3.2	1	4.1
2	2.4	2	3.6	2	3.0
3	2.3	3	3.3	3	3.0
4	2.7	4	3.2	4	3.1
5	2.2	5	3.2	5	3.1

Total Smoke % 13.0 16.5 16.0

Factor (b) = 45.5 / 15 = 3.0 %

Comments:

2.1	4.7	4.2
2.2	3.7	3.2
2.4	3.4	3.7
7.2	12.2	10.2

30.9 / 9

"c" factor = 2.4 %

TABLE F-30. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 705　　Test Miles: 45,706　　Test Configuration: LSN + Stock Muffler
Date: 8/18/71　　Test Hours: 3,717　　Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible]　　31.6　　[illegible]

Factor (a) = 121.4/45 = 2.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 16.8　　10.9　　11.6

Factor (b) = 39.3/15 = 2.6 %

Comments: [illegible]

22.6

"a" factor = 2.6 %

TABLE F-31. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Second Interim Inspection

Bus: 702 Test Miles: 45,706 Test Configuration: 608 + Stock Muffler
Date: 8/18/71 Test Hours: 3,717 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 57.8 50.8 [illegible]

Factor (a) = [illegible]/45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 23.8 21.7 [illegible]

Factor (b) = 74.8/15 = 5.0 %

Comments: [illegible] [illegible] [illegible]

[illegible]

"c" factor [illegible] %

TABLE F-32. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 702 Test Miles: 45,706 Test Configuration: 505 + Stock Muffler
Date: 8/18/71 Test Hours: 3,717 Fuel: EM-165-F (No. 1 Diesel)

Run 3

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.8	1	4.4	1	[illegible]
2	4.7	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	4.7	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	3.7	8	[illegible]	8	[illegible]
9	3.7	9	[illegible]	9	[illegible]
10	4.0	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	3.1	15	[illegible]	15	[illegible]

Total Smoke % 55.0 70.1 [illegible]

Factor (a) = 203.7/45 = 4.5 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	5.0	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 23.3 25.1 [illegible]

Factor (b) = [illegible]/15 = 5.1 %

Comments: [illegible]

"S" factor = 5.6 %

TABLE F-11. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 704 Test Miles: 42,474 Test Configuration: LSN + Catalytic Muffl
Date: 7/26/71 Test Hours: 3,267 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] / 45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	6.0
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = 6.0 %

Comments:

7.5 [illegible] 10.5
[illegible] [illegible] 10.5
[illegible] 7.5 9.0
[illegible] 37.0 30.0

[illegible]

"a" factor = 9.8 %

TABLE F-34. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 704 Test Miles: 45,574 Test Configuration: LSN + Catalytic Muffler
Date: 7/26/71 Test Hours: 1,567 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	8.5	1	6.2	1	11.0
2	8.0	2	6.5	2	6.8
3	6.1	3	5.6	3	5.9
4	6.1	4	4.0	4	5.3
5	6.1	5	4.6	5	[illegible]
6	7.6	6	6.3	6	[illegible]
7	9.3	7	5.6	7	6.1
8	7.6	8	5.7	8	[illegible]
9	6.8	9	[illegible]	9	[illegible]
10	6.6	10	6.1	10	[illegible]
11	5.6	11	6.0	11	6.6
12	5.3	12	5.6	12	[illegible]
13	5.0	13	5.6	13	[illegible]
14	6.7	14	5.7	14	[illegible]
15	6.6	15	6.3	15	[illegible]

Total Smoke % 88.9 84.0 [illegible]

Factor (a) = 261.1/45 = 5.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	5.7	1	5.5	1	6.0
2	5.8	2	5.8	2	6.0
3	5.8	3	6.0	3	6.5
4	6.2	4	6.1	4	7.7
5	6.0	5	6.2	5	7.0

Total Smoke % 29.5 29.6 32.5

Factor (b) = 91.6/15 = 6.1 %

Comments:

8.0	8.5	11.0
8.8	8.1	10.0
6.5	6.7	6.7
23.3	23.3	27.7

28.7

"c" factor: 8.2 %

TABLE F-35. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 704 | Test Miles: 42,274 | Test Configuration: LSN + Stock Muffler

Date: 7/27/71 | Test Hours: 3,267 | Fuel: EM-155-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
Total Smoke %	66.3		76.7		82.2

Factor (a) = [illegible]/45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
Total Smoke %	22.7		24.0		30.1

Factor (b) = [illegible]/15 = [illegible] %

Comments:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
19.7	21.3	22.3

66.3

"a" factor = 5.0 %

TABLE F-36. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 704
Date: 8/6/71

Test Miles: 42,274
Test Hours: 3,367

Test Configuration: LSN + Stuck Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	10.5	1	[illegible]	1	10.7
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	[illegible]	[illegible]
10	[illegible]	10	[illegible]	[illegible]	[illegible]
11	[illegible]	11	[illegible]	[illegible]	[illegible]
12	[illegible]	12	[illegible]	[illegible]	[illegible]
13	[illegible]	13	[illegible]	[illegible]	[illegible]
14	[illegible]	14	[illegible]	[illegible]	[illegible]
15	[illegible]	15	[illegible]	[illegible]	[illegible]

Total Smoke % 70.1 73.7 63.4

Factor (a) = 207.2/45 = 4.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	4.2	2	[illegible]
3	4.1	3	[illegible]	3	3.8
4	4.0	4	[illegible]	4	[illegible]
5	4.1	5	[illegible]	5	[illegible]

Total Smoke % 20.1 22.8 18.9

Factor (b) = 61.8/15 = 4.1 %

Comments:

10.5	11.0	10.7
5.5	6.7	5.6
5.0	5.4	6.1
21.0	23.1	22.4

66.5

"c" factor = 22.2%

TABLE F-37. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 704
Date: 7/29/71

Test Miles: 42,274
Test Hours: 3,267

Test Configuration: 608 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	18.0	1	8.0	1	12.5
2	16.0	2	12.6	2	11.5
3	8.3	3	12	3	8.6
4	8.6	4	9.8	4	[illegible]
5	7.6	5	12	5	[illegible]
6	6.1	6	13	6	[illegible]
7	6.1	7	10	7	[illegible]
8	5.6	8	8.6	8	[illegible]
9	4.6	9	10.6	9	[illegible]
10	4.5	10	8.6	10	[illegible]
11	3.7	11	8.3	11	[illegible]
12	3.8	12	6.8	12	[illegible]
13	3.5	13	6.3	13	[illegible]
14	3.4	14	6.1	14	[illegible]
15	2.2	15	5.3	15	[illegible]

Total Smoke % 115.6 133.8 141.5

Factor (a) = [illegible] = 8.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.2	1	9.4	1	8.8
2	6.1	2	10.3	2	8.9
3	6.6	3	10.4	3	9.1
4	6.4	4	10.6	4	9.1
5	6.1	5	10.6	5	[illegible]

Total Smoke % 31.4 51.3 45.6

Factor (b) = 128.3/15 = 8.6 %

Comments:

18.0
16.0
8.3
42.3

12.5
10.6
10.7
33.8

12.5
11.5
10.3
35.8

111.9/9

"a" factor : 12.4 %

TABLE F-38. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 704　　Test Miles: 42,274　　Test Configuration: 60S - Stock Muffler
Date: 7/29/71　　Test Hours: 3,267　　Fuel: EM-165-F (No. 1 Diesel)

Run 3

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 142.0　　158.7　　152.1

Factor (a) = $\frac{452.8}{45}$ = 10.0 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	10.1	2	[illegible]	2	[illegible]
3	10.6	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 52.1　　57.8　　57.1

Factor (b) = $\frac{167.0}{15}$ = 11.1 %

Comments:

15.0	17.0	14.5
12.5	16.1	10.0
11.0	14.0	14.0
38.5	47.1	38.5

$\frac{124.1}{9}$

"c" factor = 13.8%

TABLE F-39. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 707 Total Miles: 39,374 Test Configuration: LSN + Catalytic Muffler
Date: 7/12/71 Test Hours: 3,205 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 107.1 137.1 124.5

Factor (a) = 368.7/45 = 8.2 %

Logging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 41.6 44.4 37.0

Factor (b) = 123.0/15 = 8.2 %

Comments:

8.8	13.7	14.5
[illegible]	[illegible]	12.4
[illegible]	[illegible]	10.0
26.7	37.2	36.9

'c' factor: 11.2 %

TABLE F-40. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 707
Date: 7/14/71

Test Miles: 39,374
Test Hours: 3,205

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.8	1	6.6	1	6.6
2	6.4	2	7.8	2	6.8
3	8.6	3	8.8	3	8.0
4	7.6	4	8.2	4	6.1
5	6.4	5	6.3	5	6.0
6	6.6	6	6.1	6	[illegible]
7	6.3	7	7.5	7	7.6
8	8.2	8	8.7	8	[illegible]
9	8.7	9	8.1	9	[illegible]
10	7.6	10	7.6	10	7.2
11	6.4	11	7.6	11	6.6
12	6.1	12	6.6	12	7.7
13	6.6	13	6.6	13	7.5
14	5.7	14	6.1	14	5.6
15	6.1	15	6.0	15	7.2

Total Smoke % 108.7   104.7   101.1

Factor (a) = 308.7 / 45 = 6.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.8	1	7.6	1	5.5
2	7.4	2	8.3	2	6.1
3	6.7	3	7.7	3	6.6
4	6.1	4	6.5	4	5.5
5	7.0	5	8.5	5	6.3

Total Smoke % 34.6   37.4   30.1

Factor (b) = 102.1 / 15 = 6.8 %

Comments:

6.5	8.7	7.6
7.3	8.1	7.5
6.6	7.7	7.0
20.4	24.7	22.1

Lifted

[illegible] factor = 8.1 %

TABLE F-41. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 707 | Test Miles: 39,174 | Test Configuration: LSN + Stock Muffler
Date: 7/14/71 | Test Hours: 3,205 | Fuel: EM-165-F (No. 1, Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.0	1	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] | [illegible] | [illegible]

Factor (a) = [illegible] = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] | [illegible] | [illegible]

Factor (b) = [illegible] = [illegible] %

Comments: [illegible]

"c" factor = 7.5 %

TABLE F-42. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Second Interim Inspection

Bus: 707
Date: 7/15/71

Test Miles: 39,374
Test Hours: 3,305

Test Configuration: 60B + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] / 45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = [illegible] %

Comments: [illegible]

"A" factor: [illegible] %

TABLE F-43. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Second Interim Inspection

Bus: 707
Date: 7/15/71

Test Miles: 39,374
Test Hours: 5,205

Test Configuration: 60S + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	11.7	1	[illegible]	1	10.0
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 108.9 98.7 96.6

Factor (a) = 304.2/45 = 6.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 39.1 42.4 30.1

Factor (b) = 111.6/15 = 7.4 %

Comments:

11.7	6.5	10.0
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]

"a" factor = 8.9 %

TABLE F-44. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 702
Date: 3/9/72

Test Miles: 80,116
Test Hours: 6,475

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	3.0	15	[illegible]	15	[illegible]

Total Smoke % 58.6 | 54.8 | [illegible]

Factor (a) = 166.7 / 45 = 3.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 21.2 | 20.8 | 23.1

Factor (b) = 65.2 / 15 = [illegible] %

Comments: [illegible]

'a' factor = [illegible] %

TABLE F-45. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 702
Date: 3/9/72

Test Miles: 80,116
Test Hours: 5,475

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 5

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
Total Smoke %	[illegible]		[illegible]		[illegible]

Factor (a) = [illegible]/45 = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
Total Smoke %	18.6		20.7		[illegible]

Factor (b) = [illegible]/15 = [illegible]

Comments: [illegible]

"S" factor = [illegible] %

TABLE F-46. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Third Interim Inspection

Bus: 702
Date: 3/14/73

Test Miles: 83,116
Test Hours: 6,475

Test Configuration: 605 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] 68.6 63.1

Factor (a) = 202.7/45 = 4.5 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible]/15 = [illegible] %

Comments:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

"C" factor = [illegible] %

TABLE F-47. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 702 Test Miles: 80,116 Test Configuration: 608 + Stock Muffler
Date: 3/14/72 Test Hours: 5,475 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 61.1 61.6 52.1

Factor (a) = [illegible]/45 = 3.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 31.0 22.3 24.1

Factor (b) = [illegible]/15 = 5.0 %

Comments: [illegible]

"c" factor 5.2 %

TABLE F-45. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 704 Test Miles: 79,722 Test Configuration: LSN + Stock Muffler
Date: 2/21/72 Test Hours: 6,135 Fuel: EM-165-F (No. 1 Diesel)

Run :

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible]/45 = 4.3 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible]/15 = 4.3 %

Comments: [illegible] [illegible] [illegible]

'C' factor = 9.0%

TABLE F-49. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 704
Date: 8/11/72

Test Miles: 79,722
Test Hours: 6,125

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	10.5	1	6.6
2	10.0	2	[illegible]	2	6.5
3	8.8	3	[illegible]	3	[illegible]
4	6.0	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 66.2 61.9 60.5

Factor (a) = 188.6/45 = 4.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]		[illegible]

Total Smoke % 22.4 22.0 22.4

Factor (b) = 66.8/15 = 4.45

Comments:
10.0 10.5 6.6
8.8 [illegible] 6.5
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]

[illegible]

"c" factor = [illegible] %

TABLE F-50. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 704
Date: 2/24/72
Test Miles: 79,723
Test Hours: 5,125
Test Configuration: 605 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	14.0	1	10.0	1	8.6
2	[illegible]	2	[illegible]	2	12.0
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 104.4 118.1 108.8

Factor (a) = 331.3 / 45 = 7.4 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 33.9 37.8 36.7

Factor (b) = 108.4 / 15 = 7.2 %

Comments:

14.0	10.0	8.6
[illegible]	[illegible]	12.0
[illegible]	[illegible]	[illegible]
32.7	32.8	30.3

"c" factor = 10.4%

TABLE F-51. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 704　　Test Miles: 79,722　　Test Configuration: 608 + Stock Muffler
Date: 2/24/72　　Test Hours: 6,125　　Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	11.0	1	12.3	1	12.0
2	7.6	2	10.6	2	14.6
3	6.9	3	6.6	3	8.7
4	6.7	4	5.7	4	8.7
5	6.8	5	5.5	5	8.1
6	5.8	6	5.8	6	6.7
7	6.8	7	5.7	7	6.9
8	6.9	8	6.3	8	8.7
9	6.8	9	6.1	9	[illegible]
10	6.0	10	6.1	10	[illegible]
11	5.3	11	6.0	11	[illegible]
12	5.5	12	5.6	12	6.7
13	6.7	13	6.7	13	6.3
14	6.1	14	9.7	14	5.8
15	6.2	15	6.8	15	5.8

Total Smoke % 90.4　　101.6　　124.7

Factor (a) = 316.6/45 = 7.0 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	5.7	1	6.1	1	8.0
2	6.0	2	6.6	2	8.1
3	6.0	3	5.7	3	8.2
4	6.3	4	5.7	4	8.8
5	6.3	5	6.0	5	8.3

Total Smoke % 30.5　　29.9　　41.5

Factor (b) = 101.9/15 = 6.8 %

Comments:

11.0	12.3	12.0
7.0	10.6	14.6
6.6	[illegible]	[illegible]
24.6	32.7	42.9

104.6/9

"c" factor = 11.6 %

TABLE F-52. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 707 Test Miles: 77,841 Test Configuration: LSN + Stock Muffler
Date: 2/10/73 Test Hours: 6,660 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 81.2 80.5 81.5

Factor (a) = 243.2/45 = 5.4 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 26.0 27.3 25.4

Factor (b) = 78.7/15 = 5.2 %

Comments:

6.6	7.1	6.1
6.6	6.6	6.5
[illegible]	6.6	[illegible]
19.8	20.3	20.8

[illegible]

"C" factor = 7.0 %

TABLE F-51. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 707	Test Miles: 77,841	Test Configuration: LSN + Stock Muffler
Date: 2/10/72	Test Hours: 6,660	Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.5	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	3.3	14	[illegible]	14	[illegible]
15	3.1	15	[illegible]	15	[illegible]

Total Smoke % 71.6 72.9 [illegible]

Factor (a) = [illegible]/45 = 5.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	6.0	1	[illegible]
2	[illegible]	2	6.0	2	[illegible]
3	[illegible]	3	6.0	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 30.9 31.2 28.4

Factor (b) = 90.5/15 = 6.0 %

Comments:

[illegible] [illegible] [illegible]

'c' factor = 8.1 %

TABLE F-54. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 707 Test Miles: 77,841 Test Configuration: 608 + Stock Muffler
Date: 2/17/72 Test Hours: 5,660 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = [illegible]

Comments: [illegible]

"a" factor = [illegible] %

TABLE F-55. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Third Interim Inspection

Bus: 707 Test Miles: 77,861 Test Configuration: 6V8 + Stock Muffler
Date: 2/17/72 Test Hours: 6,660 Fuel: EM-165-F (No. 1 Diesel)

Run 3

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] = [illegible] %

Comments: [illegible]

"c" factor = [illegible] %

TABLE F-56. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 702 | Test Miles: 90,162 | Test Configuration: LSN + Stock Muffler
Date: 4/26/73 | Test Hours: 7,181 | Fuel: EM-165-F (No. 1 Diesel)

Run 1 — As Received

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
Total Smoke %	86.3		69.8		65.1

Factor (a) = 220.0/45 = 4.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
Total Smoke %	30.1		35.1		35.8

Factor (l) = [illegible]/15 = 6.4 %

Comments:

6.8	7.0	6.5
6.7	6.6	6.5
6.6	[illegible]	6.6
20.1	19.[illegible]	19.6

6.7

"2" factor : 6.4%

TABLE F-57. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 702
Date: 4/26/73
Test Miles: 90,162
Test Hours: 7,181
Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 2 As Received

Accelerations

First Sequence Interval No.	First Sequence Smoke %	Second Sequence Interval No.	Second Sequence Smoke %	Third Sequence Interval No.	Third Sequence Smoke %
1	7.5	1	9.0	1	8.0
2	6.1	2	6.6	2	6.0
3	5.7	3	6.2	3	6.9
4	6.7	4	6.0	4	6.7
5	4.6	5	5.6	5	7.5
6	6.0	6	6.1	6	6.5
7	6.6	7	6.0	7	6.6
8	6.4	8	5.6	8	5.6
9	4.8	9	5.0	9	5.4
10	4.7	10	5.1	10	5.2
11	6.1	11	4.4	11	5.0
12	4.3	12	4.1	12	4.3
13	4.4	13	4.9	13	4.1
14	4.1	14	4.2	14	4.1
15	4.0	15	4.3	15	4.1

Total Smoke % 75.1 74.0 78.0

Factor (a) = 227.1/45 = 5.1 %

Lugging

First Sequence Interval No.	First Sequence Smoke %	Second Sequence Interval No.	Second Sequence Smoke %	Third Sequence Interval No.	Third Sequence Smoke %
1	6.0	1	6.7	1	8.1
2	6.3	2	6.0	2	8.0
3	6.4	3	6.0	3	8.3
4	6.0	4	6.6	4	7.5
5	6.0	5	6.3	5	7.2

Total Smoke % 30.7 31.3 36.9

Factor (b) = 98.9/15 = 6.6 %

Comments:

6.5
6.2
8.4
21.1

7.0
6.2
6.9
20.1

7.8
7.5
7.3
22.6

6.6

"K" factor = 6.7 %

TABLE F-58. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 702 Test Miles: 90,162 Test Configuration: LSN + Stock Muffler
Date: 4/26/72 Test Hours: 7,181 Fuel: EM-165-F (No. 1 Diesel)

Run 1 After Adjustment to 1,470

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] / 45 = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = [illegible]

Comments: [illegible]

Avg. "c" factor = 5.0 %

TABLE F-59. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 702
Date: 4/26/72

Test Miles: 90,162
Test Hours: 7,181

Test Configuration: LSN + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 5 After Adjustment to 1,470

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible] / 45 = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = [illegible]

Comments: [illegible] [illegible] [illegible]

[illegible] "c" factor = [illegible] %

TABLE F-60. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Unscheduled Inspection

Bus: 704 Test Miles: 89,548 Test Configuration: LSN + Stock Muffler
Date: 4/27/72 Test Hours: 6,721 Fuel: EM-165-F (No. 1 Diesel)

Run 1 As Received

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	26.0	1	11.6	1	8.0
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	6.0
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 133.6 85.0 83.1

Factor (a) = 301.7/45 = 6.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	4.3
2	[illegible]	2	[illegible]	2	6.0
3	[illegible]	3	[illegible]	3	6.0
4	[illegible]	4	[illegible]	4	6.1
5	[illegible]	5	[illegible]	5	6.1

Total Smoke % 22.4 27.5 29.5

Factor (b) = 79.4/15 = 5.3 %

Comments:

26.0	11.6	8.0
[illegible]	[illegible]	6.5
[illegible]	[illegible]	6.6
[illegible]	21.2	21.1

[illegible]

'C' factor: 11.6 %

TABLE F-61. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 704 Test Miles: 89,546 Test Configuration: LSN + Stock Muffler
Date: 4/27/75 Test Hours: 6,721 Fuel: EM-165-F (No. 1 Diesel)

Run 3 As Received

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 71.7 77.7 80.7

Factor (a) = 230.1/45 = 5.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 23.3 24.5 27.2

Factor (b) = 76.0/15 = 5.1 %

Comments: [illegible]

"D" factor = 5.3 %

TABLE F-65. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Unscheduled Inspection

Bus: 704　　Test Miles: 89,548　　Test Configuration: LSN + Stock Muffler
Date: 4/27/72　　Test Hours: 6,721　　Fuel: EM-165-F (No. 1 Diesel)

Run 1　　After Adjustment to 1,470

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 56.6　　58.1　　[illegible]

Factor (a) : 174.4/45 = 3.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 18.0　　18.6　　20.6

Factor (b) : 57.2/15 = 3.8 %

Comments: [illegible]

79.4　　76.2　　76.1

4.0　"c" factor : 8.0 %

TABLE F-63. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 704　　Test Miles: 89,548　　Test Configuration: LSN + Stock Muffler
Date: 4/27/73　　Test Hours: 5,721　　Fuel: EM-165-F (No. 1 Diesel)

Run 2　　After Adjustment to 1,470

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible]　　[illegible]　　[illegible]

Factor (a) = [illegible] / 45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible]　　[illegible]　　[illegible]

Factor (b) = [illegible] / 15 = [illegible] %

Comments: [illegible]

"a" factor = 8.5 %

TABLE F-64. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 707 Test Miles: 89,251 Test Configuration: LSN + Stock Muffler
Date: 4/28/72 Test Hours: 7,535 Fuel: EM-165-F (No. 1 Diesel)

Run 1 As Received

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % 66.1 71.0 [illegible]

Factor (a) = [illegible] / 48 = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible] / 15 = [illegible]

Comment: [illegible]

"c" factor = [illegible]

TABLE F-65. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 707 Test Miles: 89,251 Test Configuration: LSN + Stock Muffler
Date: 4/28/72 Test Hours: 7,535 Fuel: EM-165-F (No. 1 Diesel)

Run 2 As Received

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	
	[illegible]		[illegible]		

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = [illegible]/45 = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
[illegible]	[illegible]		[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) = [illegible]/15 = [illegible]

Comments: [illegible] [illegible] [illegible]

[illegible] "c" factor : 5.7 %

TABLE F-66. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 707 | Test Miles: 89,251 | Test Configuration: LSN + Stock Muffler
Date: 4/28/75 | Test Hours: 7,535 | Fuel: EM-164-F (No. 1 Diesel)

Run 1 | After Adjustment to 1.470

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] | [illegible] | [illegible]

Factor (a) = [illegible]/45 = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % 15.0 | [illegible] | [illegible]

Factor (b) = [illegible]/15 = [illegible] %

Comments: [illegible]

'a' factor = [illegible] %

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TABLE F-67. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Unscheduled Inspection

Bus: 707 Test Miles: 89,251 Test Configuration: LSN + Stock Muffler
Date: 4/28/72 Test Hours: 7,535 Fuel: EM-165-F (No. 1 Diesel)

Run 3 After Adjustment to 1,470

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	10	[illegible]	10	[illegible]
[illegible]	[illegible]	11	[illegible]	11	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) : [illegible] / 45 = [illegible]

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (b) : [illegible] / 15 = [illegible]

Comments:

[illegible] [illegible] [illegible]

6.8

"C" factor = 6.8 %

TABLE F-68. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 702 Test Miles: 109,446 Test Configuration: LSM + Stock Muffler
Date: 11/14/72 Test Hours: 9,678 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.0	1	2.0	1	2.1
2	2.1	2	2.1	2	[illegible]
3	2.1	3	2.1	3	2.1
4	2.1	4	2.0	4	2.1
5	2.0	5	2.0	5	2.0
6	[illegible]	6	2.1	6	2.0
7	[illegible]	7	2.1	7	2.0
8	[illegible]	8	2.1	8	2.1
9	[illegible]	9	2.1	9	2.1
10	[illegible]	10	[illegible]	10	2.1
11	[illegible]	11	[illegible]	11	2.1
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) : [illegible]/45 = 2.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.0	1	[illegible]	1	[illegible]
2	2.1	2	[illegible]	2	[illegible]
3	2.1	3	[illegible]	3	[illegible]
4	2.1	4	[illegible]	4	[illegible]
5	2.1	5	[illegible]	5	[illegible]

Total Smoke % 10.4 [illegible] 12.9

Factor (b) : [illegible]/15 = 2.7 %

Comments: [illegible]

% factor = 2.1 %

TABLE F-69. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 702 Test Miles: 109,446 Test Configuration: LSM + Stock Muffler
Date: 11/14/73 Test Hours: 9,678 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.9	1	4.0	1	4.1
2	1.7	2	2.9	2	2.1
3	1.3	3	1.7	3	2.6
4	1.1	4	1.6	4	2.9
5	1.0	5	1.6	5	1.7
6	1.0	6	1.7	6	1.7
7	1.0	7	1.4	7	2.0
8	1.0	8	1.5	8	2.0
9	1.0	9	1.7	9	2.0
10	1.0	10	1.6	10	2.0
11	1.0	11	1.6	11	2.0
12	1.0	12	1.6	12	2.0
13	1.0	13	1.6	13	1.6
14	1.0	14	1.8	14	1.7
15	1.0	15	1.3	15	1.9

Total Smoke % 18.3 23.4 31.1

Factor (a) = 72.8/45 = 1.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	1.9	1	2.1	1	2.7
2	2.1	2	2.1	2	2.0
3	1.6	3	2.5	3	2.5
4	1.8	4	2.3	4	2.3
5	1.0	5	2.0	5	2.3

Total Smoke % 7.5 11.1 12.8

Factor (b) = 31.4 = 2.1 %

Comments:

2.0	4.0	4.1
1.9	2.1	2.6
2.3	2.2	2.9
6.2	8.3	9.6

24.6

'c' factor = 2.7%

TABLE F-70. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 705 Test Miles: 109,446 Test Configuration: 605 + Stock Muffler
Date: 11/16/75 Test Hours: 9,678 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.5	1	3.1	1	3.4
2	3.0	2	2.9	2	3.1
3	2.7	3	3.0	3	3.2
4	2.9	4	3.1	4	3.0
5	3.1	5	3.1	5	3.1
6	3.0	6	3.1	6	3.1
7	3.0	7	3.1	7	3.1
8	3.0	8	3.1	8	3.1
9	3.0	9	3.1	9	3.1
10	3.0	10	3.1	10	3.2
11	3.0	11	3.1	11	3.2
12	3.0	12	3.1	12	3.1
13	3.0	13	3.1	13	3.3
14	3.0	14	3.1	14	3.2
15	3.0	15	3.1	15	3.2

Total Smoke % 44.0 46.2 47.7

Factor (a) = 137.9/45 = 3.1 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.8	1	3.3	1	4.5
2	3.6	2	3.9	2	4.7
3	3.3	3	3.7	3	4.1
4	3.3	4	3.6	4	4.6
5	3.9	5	3.3	5	4.1

Total Smoke % 17.9 17.5 22.3

Factor (b) = 57.7/15 = 3.7 %

Comments: 3.8 3.7 4.1
3.6 3.5 4.1
3.7 3.0 4.1
11.1 10.2 12.3

34.2/9

"c" factor = 3.8%

TABLE F-71. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Final Inspection

Bus: 702 Test Miles: 109,446 Test Configuration: 60S + Stock Muffler
Date: 11/16/75 Test Hours: 7,678 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
Total Smoke %	[illegible]		[illegible]		[illegible]

Factor (a) = [illegible] = [illegible] %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
Total Smoke %	[illegible]		[illegible]		[illegible]

Factor (b) = [illegible] = [illegible] %

Comments: [illegible]

"s" factor = [illegible] %

TABLE F-75. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 704 Test Miles: 117,606 Test Configuration: LSN + Stock Muffler
Date: 10/31/75 Test Hours: 8,351 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % [illegible] [illegible] [illegible]

Factor (a) = 172.3 / 45 = 3.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]

Total Smoke % 20.1 20.1 21.0

Factor (b) = 61.2 / 15 = 4.1 %

Comments: [illegible] [illegible] [illegible]

[illegible]

N' factor = 5.0 %

TABLE F-73. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 704	Test Miles: 117,606	Test Configuration: LSN + Stock Muffler
Date: 10/31/75	Test Hours: 8,351	Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
Total Smoke % 54.0		53.6		54.1	

Factor (a) = [illegible]/45 = 3.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
Total Smoke % 19.8		20.1		21.0	

Factor (b) = [illegible]/15 = 4.1 %

Comments:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
13.8	10.7	10.8

49.2

"c" factor = 4.8 %

TABLE F-74. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 704
Date: 11/2/73

Test Miles: 117,606
Test Hours: 8,351

Test Configuration: 608 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]

Total Smoke % 66.9 65.3 70.4

Factor (a) = [illegible]/45 = 4.6 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.9	1	5.0	1	[illegible]
2	4.9	2	5.0	2	5.0
3	4.9	3	5.0	3	[illegible]
4	4.7	4	5.1	4	[illegible]
5	5.0	5	5.0	5	[illegible]

Total Smoke % 24.4 25.1 25.4

Factor (b) = 74.9/15 = 5.0 %

Comments:

[illegible] - [illegible] %

TABLE F-75. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Final Inspection

Bus: 704 | Test Miles: 117,606 | Test Configuration: 608 + Stock Muffler
Date: 11/5/75 | Test Hours: 8,551 | Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
6	[illegible]	6	[illegible]	6	[illegible]
7	[illegible]	7	[illegible]	7	[illegible]
8	[illegible]	8	[illegible]	8	[illegible]
9	[illegible]	9	[illegible]	9	[illegible]
10	[illegible]	10	[illegible]	10	[illegible]
11	[illegible]	11	[illegible]	11	[illegible]
12	[illegible]	12	[illegible]	12	[illegible]
13	[illegible]	13	[illegible]	13	[illegible]
14	[illegible]	14	[illegible]	14	[illegible]
15	[illegible]	15	[illegible]	15	[illegible]
Total Smoke %	55.3		57.6		61.7

Factor (a) = 174.6/45 = 3.9 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	[illegible]	1	[illegible]	1	[illegible]
2	[illegible]	2	[illegible]	2	[illegible]
3	[illegible]	3	[illegible]	3	[illegible]
4	[illegible]	4	[illegible]	4	[illegible]
5	[illegible]	5	[illegible]	5	[illegible]
Total Smoke %	22.8		22.7		24.2

Factor (b) = 69.7/15 = 4.6 %

Comments: [illegible]

3 peaks = 5.2 %

TABLE F-76. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 707 Test Miles: 119,184 Test Configuration: LSN + Stock Muffler
Date: 11/6/75 Test Hours: 9,264 Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	6.7	1	4.1	1	4.0
2	6.1	2	4.0	2	3.1
3	6.2	3	4.1	3	4.1
4	6.6	4	4.2	4	4.1
5	10.0	5	3.4	5	4.6
6	7.0	6	3.6	6	3.4
7	6.0	7	3.5	7	3.5
8	4.4	8	4.0	8	4.0
9	3.9	9	3.3	9	3.0
10	3.2	10	3.0	10	3.1
11	3.0	11	3.0	11	[illegible]
12	3.0	12	3.0	12	3.0
13	3.1	13	3.0	13	3.1
14	3.2	14	3.1	14	3.4
15	3.8	15	3.1	15	3.2

Total Smoke % 100.2 55.5 56.7

Factor (a) = $\frac{212.4}{45}$ = 4.7 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.7	1	3.6	1	3.1
2	3.9	2	3.6	2	3.1
3	4.1	3	3.6	3	3.0
4	4.0	4	3.4	4	3.1
5	4.0	5	3.1	5	3.1

Total Smoke % 19.7 17.3 15.4

Factor (b) = $\frac{52.4}{15}$ = 3.5 %

Comments:

10.0	4.8	6.6
8.8	4.4	6.5
8.2	4.7	6.6
27.0	13.9	19.7

60.6

"c" factor = 6.7 %

TABLE F-77. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 707 Test Miles: 119,184 Test Configuration: LSN + Stock Muffler
Date: 11/6/72 Test Hours: 9,264 Fuel: EM-165-F (No. 1 Diesel)

Run 3

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.5	1	2.7	1	3.0
2	4.4	2	2.0	2	4.8
3	4.0	3	2.1	3	3.0
4	4.0	4	2.1	4	3.0
5	4.4	5	2.4	5	3.1
6	4.2	6	2.0	6	3.0
7	4.0	7	2.4	7	3.1
8	4.7	8	2.2	8	3.1
9	4.1	9	2.4	9	3.1
10	4.0	10	2.3	10	3.2
11	4.0	11	2.6	11	3.0
12	4.7	12	2.6	12	3.1
13	3.7	13	2.6	13	3.7
14	3.6	14	2.1	14	2.6
15	3.7	15	2.3	15	2.4

Total Smoke % 62.6 37.3 44.7

Factor (a) = 144.6 / 45 = 3.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.0	1	2.3	1	3.0
2	4.0	2	2.4	2	3.0
3	3.1	3	2.4	3	3.0
4	3.1	4	2.5	4	3.0
5	4.0	5	2.6	5	3.0

Total Smoke % 18.8 13.5 15.0

Factor (b) = 47.3 / 15 = 3.2 %

Comments:

4.5	3.7	4.2
4.0	3.0	3.1
3.5	2.6	3.3
12.0	9.7	10.6

Lugs

'd' factor: 3.8%

TABLE F-79. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION

Final Inspection

Bus: 707
Date: 11/9/72
Test Miles: 119,184
Test Hours: 9,364
Test Configuration: 6V3 + Stock Muffler
Fuel: EM-165-F (No. 1 Diesel)

Run 1

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	4.6	1	3.5	1	3.5
2	5.0	2	4.0	2	4.3
3	3.6	3	3.7	3	4.1
4	3.7	4	3.5	4	4.2
5	3.7	5	3.6	5	4.6
6	3.8	6	3.3	6	4.1
7	3.7	7	3.8	7	4.4
8	3.8	8	4.0	8	4.3
9	3.8	9	4.4	9	4.3
10	3.7	10	4.1	10	4.2
11	3.5	11	3.7	11	4.0
12	3.4	12	3.8	12	3.8
13	4.0	13	3.6	13	3.8
14	[illegible]	14	3.3	14	3.8
15	3.1	15	3.2	15	3.6

Total Smoke % 53.0 54.5 63.0

Factor (a) : 170.5/45 = 3.8 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.8	1	4.0	1	4.0
2	3.6	2	4.2	2	4.1
3	3.8	3	4.1	3	4.0
4	3.4	4	4.1	4	4.3
5	3.5	5	4.1	5	4.1

Total Smoke % 18.8 20.5 20.7

Factor (b) : 59.0/15 = 3.9 %

Comments:

3.8	4.4	4.3
3.9	4.4	4.7
3.8	4.0	4.5
11.5	12.8	13.5

3/4 "C" factor = 4.4 % d

TABLE F-79. FEDERAL SMOKE TEST RESULTS - CHASSIS VERSION
Final Inspection

Bus: 707 Test Miles: 119,184 Test Configuration: 60S + Stock Muffler
Date: 11/9/72 Test Hours: 9,364 Fuel: EM-165-F (No. 1 Diesel)

Run 2

Accelerations

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	3.8	1	4.5	1	4.6
2	3.7	2	6.0	2	3.7
3	2.1	3	3.6	3	3.6
4	3.0	4	3.4	4	3.6
5	4.8	5	3.0	5	3.3
6	4.7	6	3.6	6	3.8
7	2.5	7	3.7	7	3.4
8	2.5	8	3.1	8	3.7
9	2.2	9	3.1	9	3.6
10	2.0	10	3.1	10	3.4
11	2.0	11	3.0	11	3.1
12	2.1	12	2.9	12	3.0
13	2.3	13	2.7	13	3.1
14	2.6	14	2.6	14	3.2
15	2.2	15	2.5	15	3.2

Total Smoke % 43.1 45.3 53.3

Factor (a) = 141.7 / 45 = 3.2 %

Lugging

First Sequence		Second Sequence		Third Sequence	
Interval No.	Smoke %	Interval No.	Smoke %	Interval No.	Smoke %
1	2.8	1	2.8	1	3.3
2	2.8	2	3.0	2	3.3
3	2.6	3	3.1	3	3.3
4	3.1	4	3.1	4	3.2
5	3.0	5	3.0	5	3.1

Total Smoke % 14.8 15.1 16.2

Factor (b) = 45.7 / 15 = 3.0 %

Comments:

3.8	6.0	4.6
3.3	3.6	3.7
3.2	3.4	3.6
10.3	10.3	12.8

33.8

"c" factor = 3.8 %

APPENDIX G

SUPPLEMENTARY REPORTS AND CORRESPONDENCE

SAN ANTONIO TRANSIT SYSTEM [illegible]

December 10, 1971

Mr. John J. Killinger
Staff Engineer - Coaches
General Motors Corporation
660 South Boulevard, East
Pontiac, Michigan 48053

Dear John:

In my letter to you dated July 27 of this year I mentioned that we planned to conduct a test to determine the amount of dirt collected by the T.I.P. air cleaner as compared with the standard air cleaner, and you expressed interest in what we came up with.

I am enclosing copy of the results of this test, which has just recently been concluded.

We hope this information will be helpful in working out an answer to the problem. Should you have any question, give us a call or drop us a line.

Sincerely,

K. M. Kendall

K.M.Kendall
Manager of Maintenance

C-2

kmk:es

REPORT ON COMPARISON OF E.I.P. TYPE AIR FILTER TO STANDARD PAPER FILTER

I. HISTORY

When three of our buses numbered 703, 704, and 707, respectively, were equipped with test E.I.P. kits, we were impressed - among other things - with the large air cleaner elements and their supposed potential for long life. As time went along, it became obvious that something was very much wrong with the air intake system inasmuch as air cleaner elements that looked as though they would last a long time were signalling with their load indicators that they had completed their useful service life and needed to be replaced because of their high inlet air restriction. On inspection it was found that the elements were in fact loaded with dirt and needed to be replaced after only approximately 25,000 miles.

New elements were received from GMC and installed on the buses. The old elements were from the Farr Corporation and the new units were Donaldson #P11-0150. These units lasted approximately 10,000 miles and were also filled with dirt. It was then decided to run a comparison between these new type elements and the standard filter element A-C #A221-C.

II. PROCEDURE

1. Determine the runs to which all three E.I.P. buses are assigned. Select one bus for the test - maximum mileage preferable.

2. Select bus with standard dry type filter which precedes or follows the selected E.I.P. bus and which runs approximately the same mileage.

3. Accurately weigh clean filters of each type and install on the two test buses. Place tags on each installed filter, cautioning that they are under test and are not to be disturbed. Take and record manometer readings, weight, etc. (also hourmeters).

4. Take and record manometer readings and hourmeter readings monthly, both buses on same date.

5. Determine, as the test progresses, when to terminate the test.

6. At termination, very accurately weigh each filter after careful removal, recording pertinent data.

7. After any operator sign-up during the test, work with Station Foreman on assignment of the two buses to runs as mentioned in 1. and 2. above.

III. IMPLEMENTATION

We found that the plastic indicator provided on the bus could not be trusted to show the element was restricting the air flow so had to install a vacuum gauge reading in inches of H_2O and take readings directly.

After both elements were installed, we put locks on the filter assembly to insure that the elements would not be "lost."

Both buses were put in base service at approximately nineteen hours per day service.

We tried to keep the two units as close together as we could but bus #707 got consistently more hours per day, thus more miles. It is felt, however, that converting the mileage/weight figure to "Dirt accumulation per thousand miles" a good comparison could be achieved.

IV. RESULTS

Bus #707 ran a total of 11,088 miles from September 30, 1971, to November 23, 1971, in which time the test air filter element gained 4.540 lbs of dirt, etc.

Bus #824 ran a total of 9,092 miles from September 30, 1971, to November 23, 1971, in which time the standard "cyclo-pak" air filter gained .179 lbs of dirt, etc.

When the large test element had ingested 4.54 lbs, the inlet air restriction had raised to 30 inches H_2O @ 2100 RPM, while the standard element showed less than 25 inches H_2O.

V. CONCLUSIONS AND PROJECTIONS.

Both filter elements did an excellent job of removing the dirt from the air.

In the 11,088 miles the test element ran, it gained 4.54 lbs or .4095 lbs per thousand miles of operation. At the same time, the standard element gained .179 lbs in 9,092 miles or .0197 lbs per thousand miles of operation. By dividing the .4095 lbs per thousand by the .0197 lbs per thousand, we find the test element gained weight at a rate 20 times as fast as the standard element. If the test element could be arranged to gain dirt at the same rate as the standard, the larger element could be expected to last 231,632 miles or approximately one-half the life of the bus.

The standard unit seemed to be filled with dust where the dirt in the test element had the appearance of a mud made with dirt and oil.

The two elements are now storedin separate plastic bags and neither bag shows sign of condensed moisture on the inside as would be expected if the elements had gotten damp while in service.

It should also be noted that the dirt in the test element is darker that the dirt in the standard element. (Perhaps the test element is pulling in exhaust soot from somewhere.)

The only real difference between the two systems - other than their size - is the location of the air intake.

Coach Service Information Bulletin

IMPORTANT - All Service Personnel Should Read and Initial

NUMBER: C-71-1-18
GROUP: 6B-ENGINE-39

DATE: July 14, 1971

Subject: INJECTOR ROCKER ARMS

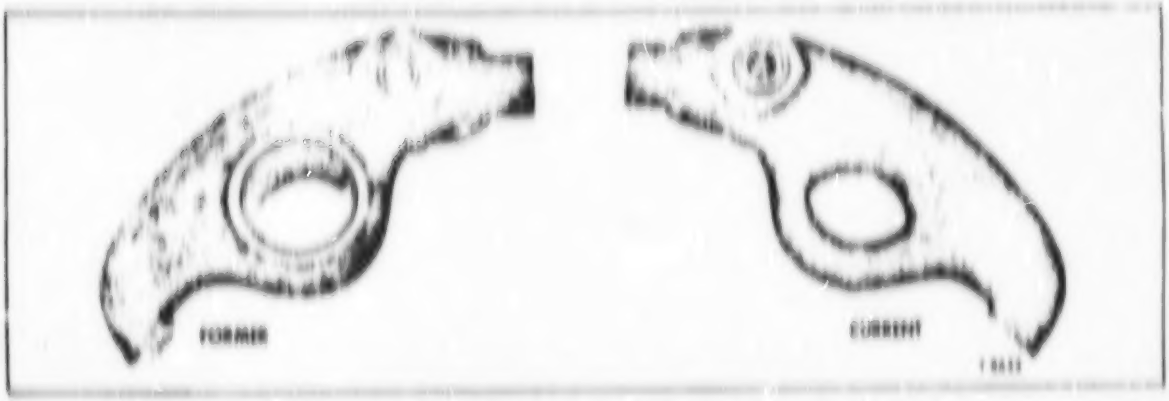
Models: ALL MODELS WITH DETROIT DIESEL ENGINES

Effective: PRODUCTION AND SERVICE

As a product improvement the injector rocker arm used on Detroit Diesel engines (for coach application only) has been redesigned. The current rocker arm assembly is identical to the former with the exception that the bronze bushing at the push rod clevis pin has been removed. This area is now reamed to size and lubrited to accept the clevis pin without a bushing. The current and the former rocker arms are completely interchangeable.

Listed below are the current and former part numbers:

FORMER PART NO.	CURRENT PART NO.
5179954	5146871



Pontiac, Michigan

Printed in U.S.A.

March 7, 1978

Mr. Charles Daniels
Urban Mass Transportation Administration
U. S. Department of Transportation
Nassif Building
400 7th Street, S. W.
Washington, D. C. 20591

Dear Chuck:

This will refer to our recent telephone conversation, and to Mr. Norman Hill's letter of February 3,1978 having to do with the need for replacement of new injector rocker arms when LSN injectors are installed in older coaches.

We agree with Mr. Hill's recommendation that the new rocker arm should be included in any conversion program involving the installation of LSN injectors in diesel-powered coaches. As a matter of information, the new injector rocker arm eliminates the small bronze bushing at the push-rod clevis pin connection. This change in design helps to eliminate the possibility of retardation of the injector timing which has a tendency to contribute to excessive smoke.

In other words, the previously designed rocker arm had a bronze bushing in it which with time would wear. This wear condition would then result in the retarding of the injector timing, resulting in the smoke. As stated above, the new rocker arm eliminates this possibility and insures to a greater degree a smoke-free condition.

At the time the E.I.P. was developed, the new rocker arm was not available, and consequently it was not a part of our proposed kit. The new rocker arm was released last summer, long after the E.I.P. kit was introduced in the marketplace and through an oversight on our part we failed at a later date to advise you of the availability of the improved rocker arm.

Mr. Charles Daniels
-2-
March 7, 1978

We highly recommend that whenever a bus property obtains UMTA funding to convert the old type "N" or "S" crown valve injectors to the new LAN injectors, the funding also provide for the new rocker arms. The cost to the operator for each rocker arm is $5.43, and it is identified by part #5146071. Six such rocker arms are required on the 6V-71, and of course, 8 on the 8V-71.

It goes without saying that we appreciate Mr. Hill bringing this matter to our attention, and by copy of this letter we are thanking him in this regard.

Sincerely,

E. R. Stokel
Coach Sales Manager

ERS:mab

CC: Mr. F. Norman Hill
General Manager
San Antonio Transit System
San Antinio, Texas

UNITED STATES GOVERNMENT
Memorandum

DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION

DATE: January 18, 1972

In reply refer to:

SUBJECT: EIP Kit Policy

FROM: W. B. Hurd

TO: OPO Staff

The following policy regarding the EIP Kits manufactured or supplied by the General Motors Corporation and the Flxible Company for diesel buses has been approved by the Administrator upon the basis of test results under demonstration project INT-MTD-20:

1. New Diesel buses

   a. LSN-type needle valve injectors will be required.

   b. Other components of the EIP kit, except the catalytic muffler, will be optional with the project sponsor.

   c. UMTA will not participate in the purchase of catalytic mufflers.

2. Diesel buses in service

   a. UMTA will participate in the purchase and installation of LSN-type needle valve injectors for the conversion of all or most of that portion of a carrier's fleet which is equipped with less efficient injectors. Vehicles with a remaining service life of less than 2 years will be excluded.

   b. UMTA will participate in the purchase and installation of other components of the EIP kit, except the catalytic muffler, for the modification of all or most of a carrier's fleet. Vehicles with a service life of less than 3 years will be excluded.

   c. UMTA will not participate in the purchase and installation of catalytic mufflers.

3. Priority

   a. New Diesel buses

      -- Not applicable

   b. Diesel buses in service

      -- All applications for assistance in the purchase and installation of LSH-type needle valve injectors which meet this policy and statutory requirements will be funded.

      -- Applications for assistance in the purchase and installation of other components of the EIP kit will be given priority on the basis of usual UMTA criteria and the local transit improvement program.

Assistant Administrator

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